PACE®
INCORPORATED

ISO 9001 CERTIFIED

PRC 2000 SYSTEMS

SERVICE MANUAL

MANUAL NO. 5050-0344

REV. C

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INCORPORATED
Systems for Development, Production and Repair of Electronic Assemblies

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GENERAL INFORMATION

INTRODUCTION

The information contained in this manual will assist the technician in performing preventive maintenance and repair of the PACE PRC 2000 Systems. For details on operation of the system, refer to the System Operation & Maintenance Manual (PACE part number 5050-0313). If you encounter any difficulty operating or repairing your system, call PACE Customer Service directly at Tel. (301) 490-9860 or FAX (301) 604-9215.

The PRC 2000 is a Process Control System for Universal Assembly and Repair of Electronic Assemblies. The system combines the latest technology available for all types of component installation/removal, circuit board preparation and repair into one self-contained workstation.

The SR-4 “Safety Rating” designation on the back panel is your assurance that the PRC 2000 meets or exceeds all applicable civilian and military standards (including *MIL-STD-2000A, and *WS-6536), EOS/ESD and worldwide electrical codes. ***NOTE** - Systems equipped with a special current limiting option (1 meg ohm tip to ground resistance) comply with EN 100015-1. PACE refers to these systems as "Soft Ground Systems".

The PRC 2000 system is available using power sources in either the 100 VAC version, the 115 VAC version or the 230 VAC version. The 230 VAC version system (production as of Sept. 1995) bears the CE Conformity Marking which assures the user that it conforms to all the requirements of council directive EMC 89/336/EEC.

SPECIFICATIONS

POWER REQUIREMENTS

PPS 400 (PRC 2000 system):	115 VAC System - Operates on 97-127 VAC, 60 Hz. 400 Watts.
PPS 400J (PRC 2000J system):	230 VAC System - Operates on 90-115 VAC, 50/60 Hz. 400 Watts.
PPS 400E (PRC 2000E system):	100 VAC System - Operates on 195-264 VAC, 50/60 Hz. 400 Watts.

PHYSICAL PARAMETERS

Size:	35 cm W x 17.5 cm H x 23 cm D (13.75 in W x 6.9 in H x 9.25 in D)
Weight:	13.6 Kg (30 Lbs)

ENVIRONMENTAL REQUIREMENTS

Ambient Operating Temperature:	0°C to 50°C (32°F to 120°F).
Storage Temperature:	-40°C to 100°C (-40°F to 212°F).

GENERAL INFORMATION

THERMAL MANAGEMENT CENTER

VACUUM AND AIR

Measurements at Front Panel **SNAP-VAC** and **PRESSURE** Ports of power source.

Vacuum Rise Time :	Evacuates 33 cc (2 cubic inch) volume to 25 cm Hg. (10 in. Hg.) in 150 ms.
Vacuum:	51 cm Hg. (20 in. Hg.) (nominal)
Pressure:	.48 Bar (7 P.S.I.) (nominal, "**MAX**" setting)
Air Flow:	13 SLPM (0.46 SCFM) maximum

HANDPIECES

Set Temperature Range of SensaTemp Handpieces:	38°C to 482°C (100°F to 900°F) (see note).
Digital Readout Resolution:	± 1° (°C or °F)
Tip Temperature Stability:	± 1.1°C (± 2°F) at idle from Set Tip Temperature.

NOTE

True minimum and maximum Operating Tip Temperatures may vary depending on handpiece & tip selection.

EOS/ESD

Tip-To-Ground Resistance:	Less than 5 ohms.
AC Leakage :	Less than 2 millivolts RMS from 50Hz to 500Hz.

PIK AND PASTE

Vacuum (at **PIK-VAC** Port)**:**	7.6 cm Hg. (3 in. HG.) min.
Pressure (at **PASTE DISP** Port)**:**	2.41 Bar (35 P.S.I.) min.

GENERAL INFORMATION

MICROCHINE

HANDPIECE

Nominal Output Speed Range:	2,500 rpm, min. to 10,000 rpm, max.
Output Torque:	14 N•mm (2.0 inch-ounces), min.
Speed Regulation:	+10/-15% over Line/Load range of 0 to 14 N•mm (0 to 2 inch-ounces) from low line to high line voltage.
Duty Cycle:	Application Dependent. Continuous loading to maximum torque (Status LED Amber in color) will cause the handpiece case to overheat. Continuous heavy loading without a cooling period may cause damage to the handpiece and/or the power source.
Shaft Run-Out at Collet:	.13mm (0.005 inches) TIR (Total Indicator Reading) max.

EOS/ESD

Tip-To-Ground Resistance:	Less than 5 ohms.
AC Leakage :	Less than 2 millivolts RMS from 50Hz to 500Hz, min.

PULSE PLATE

Output Voltage Range:	0 - 10 volts unfiltered, full wave DC.

PULSE HEAT

Output Voltage Range:	0 - 2.3 VAC RMS

GENERAL INFORMATION

PARTS IDENTIFICATION

SYSTEM

1. **POWER SWITCH -** Turns system ON (“1”) and OFF (“0”); controls input power to the system.

2. **FOOT PEDAL SELECTOR SWITCH -** Control knob provides foot pedal connection to Pik and Paste (**PD**), MicroChine (**MC**), Pulse Plate (**PP**) or Pulse Heat (**PH**) features.

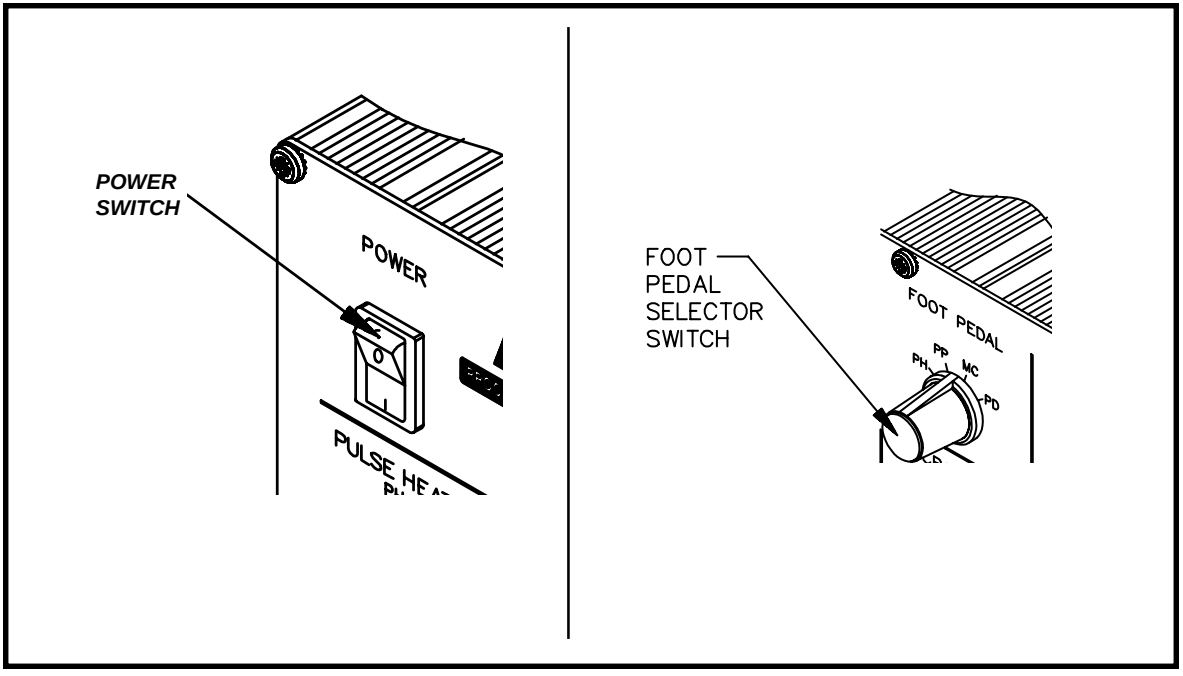


Figure 1. Power Switch/Foot Pedal Selector Switch

FRONT PANEL FEATURES

PULSE HEAT

3. **PULSE HEAT OUTPUTS -** Low voltage AC power outputs for Low Voltage, Pulse Heat handpieces.

4. **PULSE HEAT OUTPUT CONTROL -** Controls low voltage AC power at **PULSE HEAT** Outputs.

5. **PULSE HEAT LED -** Illuminates Green in color when power is applied (by foot pedal through **FOOT PEDAL** Selector Switch) to the **PULSE HEAT** Outputs.

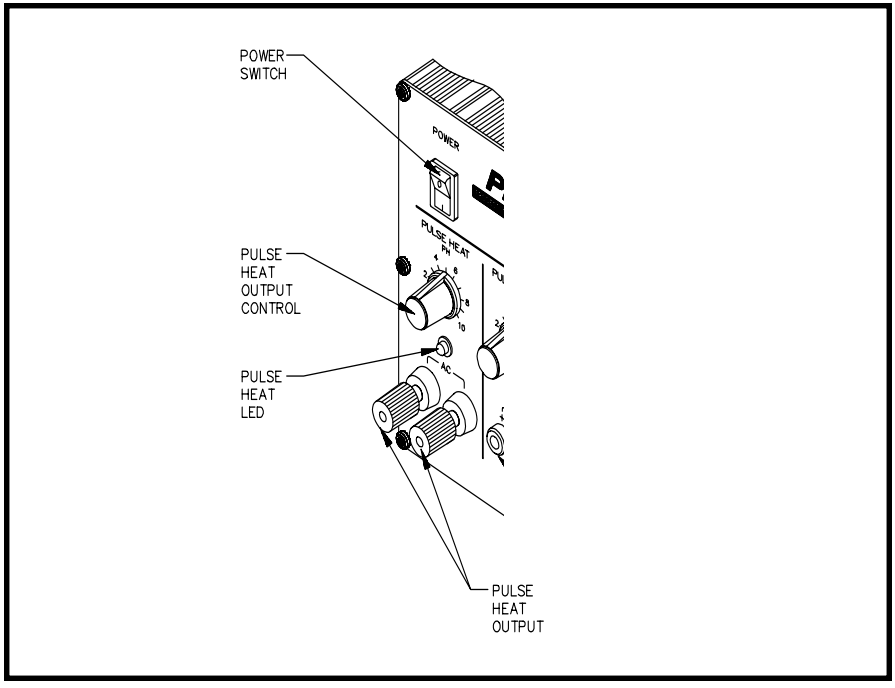


Figure 2. Pulse Heat Section

PULSE PLATE

6. **PULSE PLATE OUTPUTS -** DC power connections for PACE SwaPlater plating system.

7. **PULSE PLATE OUTPUT CONTROL -** Controls DC power at **PULSE PLATE** Outputs.

8. **PULSE PLATE LED -** Illuminates Green to indicate when power is applied (upon foot pedal actuation) at the **PULSE PLATE** Outputs. Illuminates Red if an overcurrent condition occurs during plating.

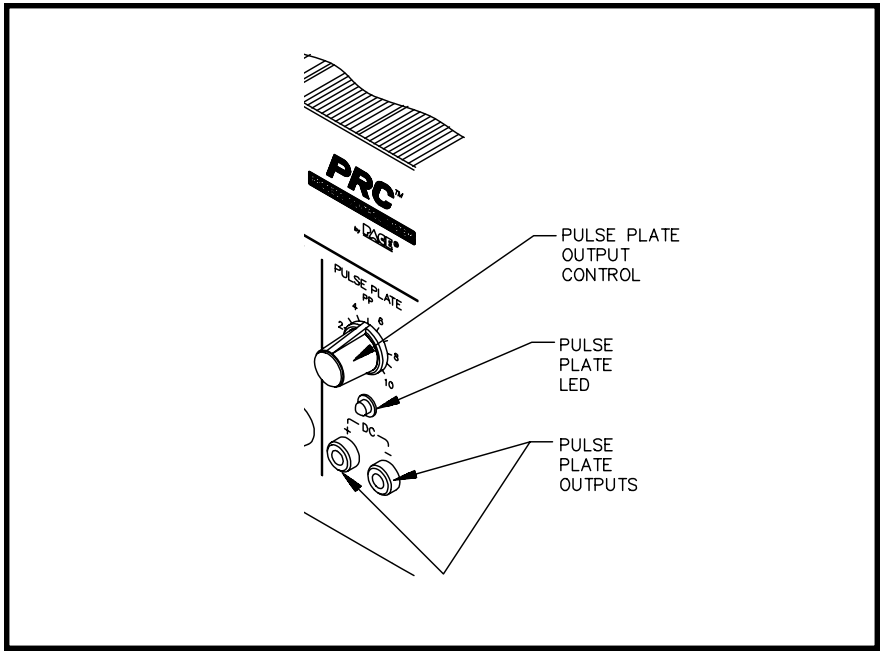


Figure 3. Pulse Plate Section

MICROCHINE

9. **MICROCHINE POWER RECEPTACLE -** Provides power, speed control, tip ground and finger switch connection for the MicroChine handpiece.

10. **VARIABLE SPEED CONTROL -** Controls motor speed (2,500 - 10,000 RPMs) of MicroChine handpiece.

11. **PROBE BRAKE RECEPTACLE -** Provides Probe Brake connection for the MicroChine Probe Brake feature. See MicroChine portion of this manual for details.

12. **STATUS LED -** Illuminates Green to indicate MicroChine operation. Illuminates Amber if maximum torque load is reached. Illuminates Red to indicate braking status when Probe Brake circuit is activated.

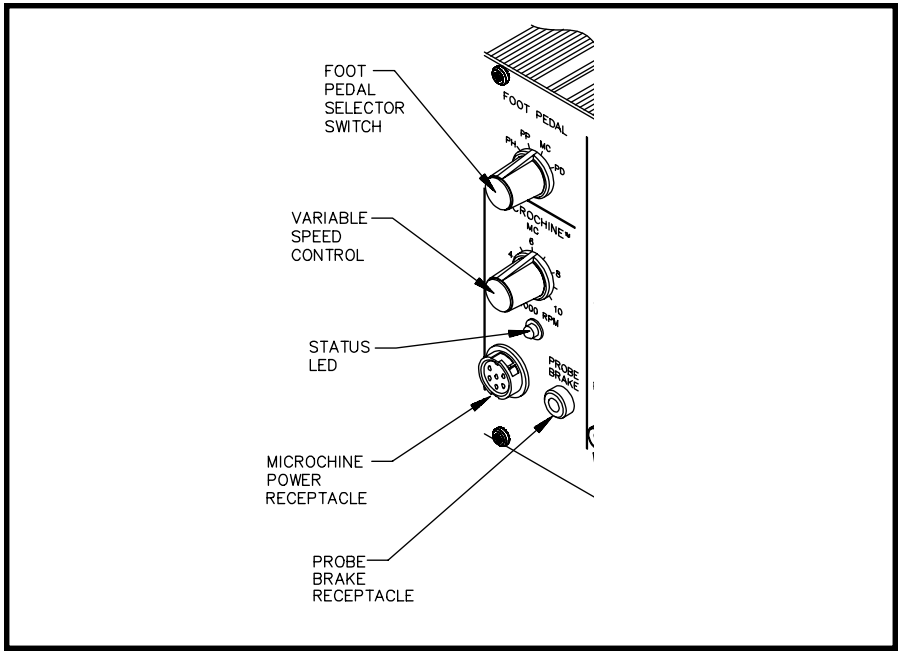


Figure 4. MicroChine Section

PIK AND PASTE

13. **PIK-VAC POWER SWITCH -** Turns power "ON" (**1**) or "OFF" (**0**). Controls power to the Pik-Vac vacuum pump.

14. **PIK-VAC LED -** Illuminates Green to indicate Pik-Vac vacuum pump operation.

15. **PIK-VAC PORT -** Quick connect fitting which provides vacuum for Pik-Vac handpiece.

16. **PIK AND PASTE TIMER CONTROL -** Determines variable time controlled shot (0.1 - 10 seconds) of Paste Dispense (**PASTE DISP**) air pressure upon foot pedal actuation (Foot Pedal Selector Switch in **PD** position). Operates when **TIMED/CONT** Switch is in the **TIMED** position.

17. **TIMED/CONT SWITCH -** In **CONT** position, continuous air pressure is delivered from **PASTE DISP** Port upon foot pedal actuation (Foot Pedal Selector Switch in **PD** position). In **TIMED** position, measured interval of air pressure (0.1 - 10 seconds) is delivered from **PASTE DISP** Port upon foot pedal actuation (Foot Pedal Selector Switch in **PD** position).

18. **PASTE DISP LED -** Illuminates Green when air pressure is delivered from the **PASTE DISP** Port. Illuminates Yellow when the paste dispense pump reservoir is charging (no air pressure delivery from **PASTE DISP** Port).

19. **PASTE DISP PORT -** Quick connect fitting which provides air pressure (timed or continuous) to dispensing barrel.

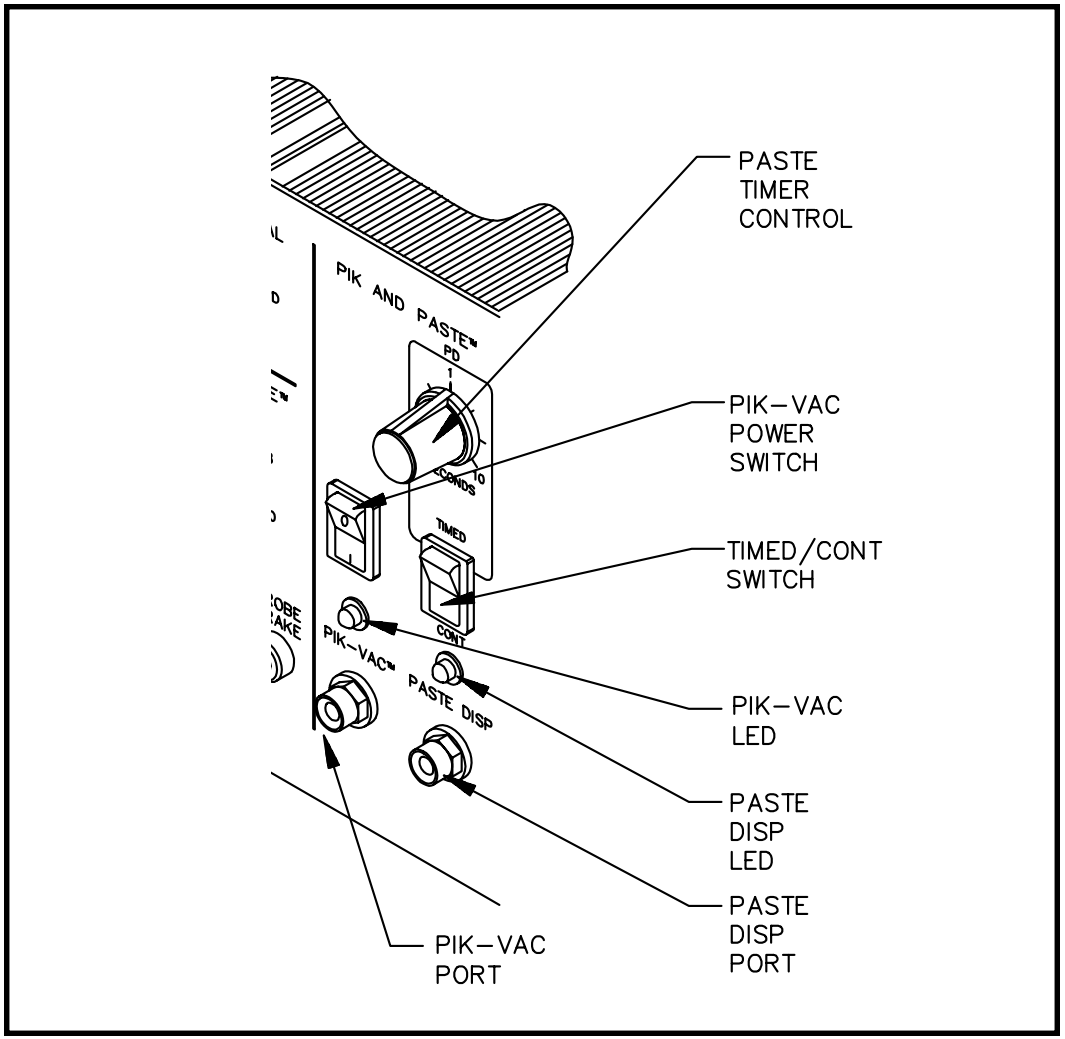


Figure 5. Pik And Paste Section

GENERAL INFORMATION

THERMAL MANAGEMENT CENTER

Refer to the illustration following for location of parts.

20. **CH 1 POWER RECEPTACLE -** Provides power, tip ground, sensing circuitry and finger switch connection from PRC 2000 system to handpiece connected to Channel 1 (**CH 1**).

21. **CH 2 POWER RECEPTACLE -** Provides power, tip ground, sensing circuitry and finger switch connection from PRC 2000 system to handpiece connected to Channel 2 (**CH 2**).

22. **CH 3 POWER RECEPTACLE -** Provides power, tip ground, sensing circuitry and finger switch connection from PRC 2000 system to handpiece connected to Channel 3 (**CH 3**).

23. **SNAP-VAC PORT -** Quick connect fitting which provides quick-rise vacuum for Sodr-X-Tractor or ThermoPik handpieces.

24. **CONTROLLABLE PRESSURE PORT -** Quick connect fitting with adjustable valve which provides variable air flow for Mini ThermoJet handpiece and Sodr-X-Tractor handpiece (in Hot Jet Mode).

25. **DIGITAL READOUT -** Provides a three digit display of the Current Channel (channel with illuminated LED; **CH 1**, **CH 2**, **CH 3** or **AUX 1**, **AUX 2**, **AUX 3**) temperature information. This includes: Operating Tip Temperature in Temperature Display Mode (normal operation), Tip Temperature Offset Constant in **TIP OFFSET** Mode, Set Tip Temperature in **TIP SET** Mode, and other information in Calibration (CAL) Mode.

26. **°F/°C KEY -** Selects °F or °C display of Set and Operating Temperatures and Tip Temperature Offset Constants.

27. **°F LED -** Illuminates when Set and Operating Tip Temperatures and Tip Temperature Offset Constants are displayed in °F.

28. **°C LED -** Illuminates when Set and Operating Tip Temperatures and Tip Temperature Offset Constants are displayed in °C.

29. **CH 1 LED -** Illuminates when Channel 1 (**CH 1**) or Auxiliary Channel (**AUX 1**) is the Current Channel (i.e., the channel (with connected handpiece/tip or auxiliary accessory) whose temperature information is displayed on the Digital Readout).

30. **CH 2 LED -** Illuminates when Channel 2 (**CH 2**) or Auxiliary Channel (**AUX 2**) is the Current Channel (i.e., the channel (with connected handpiece/tip or auxiliary accessory) whose temperature information is displayed on the Digital Readout).

31. **CH 3 LED -** Illuminates when Channel 3 (**CH 3**) or Auxiliary Channel (**AUX 3**) is the Current Channel (i.e., the channel (with connected handpiece/tip or auxiliary accessory) whose temperature information is displayed on the Digital Readout).

32. **AUX LED -** Illuminates when an auxiliary channel (on system rear panel) is the Current Channel (i.e., the channel (with connected handpiece/tip or auxiliary accessory) whose temperature information is displayed on the Digital Readout). One of the **CH 1**, **CH 2** or **CH 3** LEDs will illuminate simultaneously with the Auxiliary LED to indicate, respectively, which of the auxiliary channels is active (**AUX 1**, **AUX 2** or **AUX 3**).

33. **CH SELECT KEY -** Selects the Current Channel (among "Active Channels" i.e., those with a connected handpiece or auxiliary accessory).

34. **TIP SET KEY -** Allows the operator to adjust the Set Tip Temperature for the handpiece/tip combination or Set Temperature for the auxiliary accessory connected to the Current Channel. Places the **THERMAL MANAGEMENT CENTER** in the **TIP SET** (Tip Temperature Set) Mode.

35. **TIP SET LED -** Flashes when **TIP SET** Key is pressed indicating that the **THERMAL MANAGEMENT CENTER** is in **TIP SET** Mode.

36. **TIP OFFSET KEY -** Allows the operator to adjust the **TIP OFFSET CONSTANT** for the handpiece or auxiliary accessory connected to the Current Channel. Places the **THERMAL MANAGEMENT CENTER** in the **TIP OFFSET** (Tip Temperature Offset) Mode.

37. **TIP OFFSET LED -** Flashes when **TIP OFFSET** Key is pressed indicating that the **THERMAL MANAGEMENT CENTER** is in the **TIP OFFSET** Mode. Remains illuminated (not flashing) in Temperature Display Mode (normal operating mode) when a Tip Temperature Offset Constant of greater than "3" for °C ("6" for °F) is entered.

38. **SCROLL UP KEY -** Increases the Set Tip Temperature (in TIP TEMPERATURE SET Mode) and Tip Temperature Offset Constant (in TIP TEMPERATURE OFFSET Mode) in one, then ten degree increments. Also used in "CAL" (Calibration) Mode.

39. SCROLL DOWN KEY - Decreases the Set Tip Temperature (in **TIP SET** Mode) and Tip Temperature Offset Constant (in **TIP OFFSET** Mode) in one, then ten degree increments. Also used in "CAL" (Calibration) Mode.

40. EARTH GROUND RECEPTACLE - Provides positive earth ground to which a ground cable can be connected from the workpiece or work surface as part of a static control program.

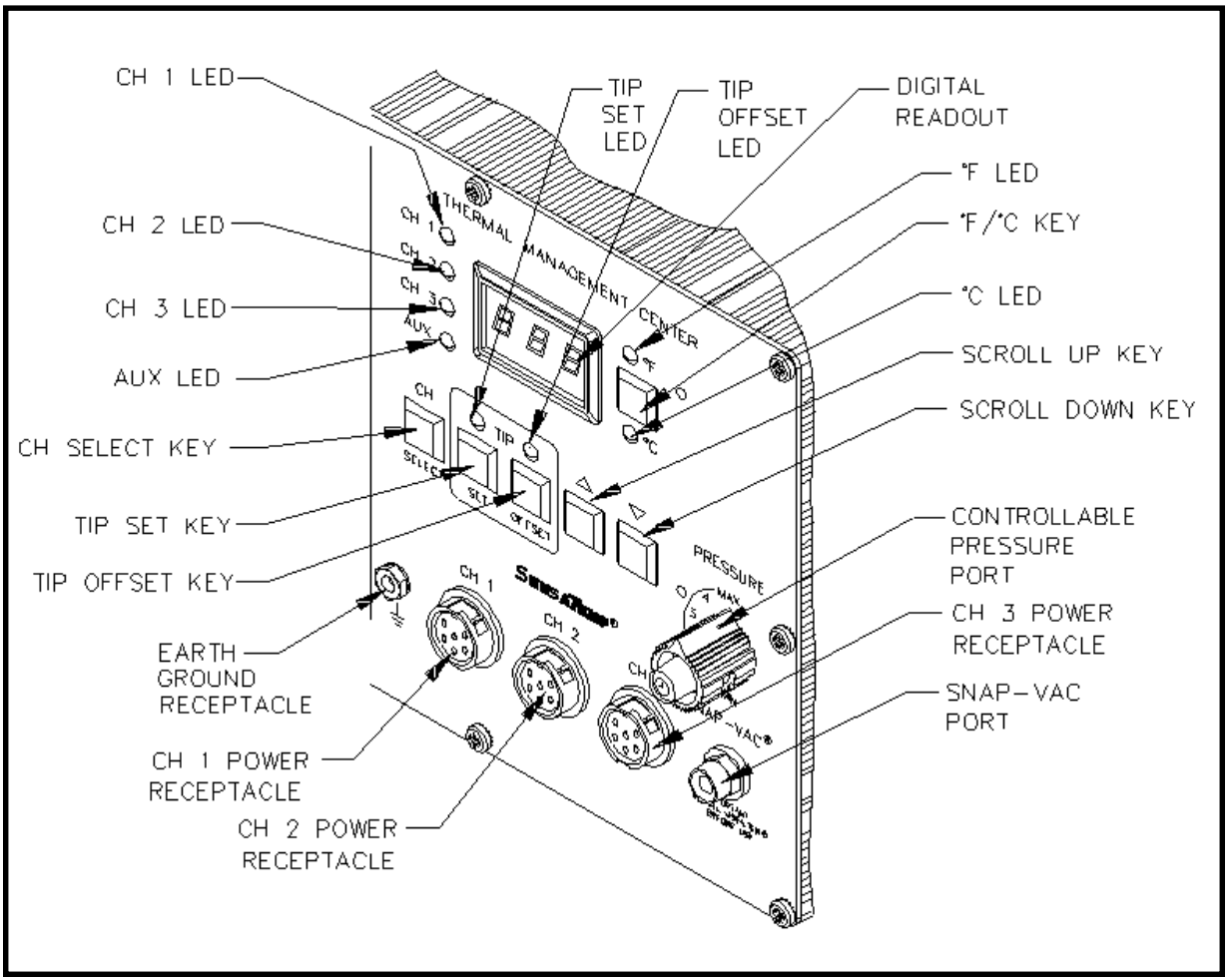


Figure 6. Thermal Management Center Parts I.D.

GENERAL INFORMATION

REAR PANEL

41. **AC POWER RECEPTACLE/FUSE HOLDER -** Receptacle for providing power to the PRC 2000 system from AC outlet through power cord. Also location of fuse (F1) which protects the system from overcurrent conditions.

42. **FUSE F1 -** Provides overload protection for PRC 2000 system.

43. **FOOT PEDAL RECEPTACLE -** Input for foot pedal which operates the Pik and Paste, MicroChine, Pulse Plate or Pulse Heat features of the system as determined by the **FOOT PEDAL** Selector Switch. This receptacle is not connected to the Thermal Management Center controls.

> **NOTE**
>
> The Auxiliary Power Receptacles listed below (items 44-46) will provide temperature control for line operated auxiliary accessories or foot pedal operation only. SensaTemp handpieces will not function properly if connected to these outputs.

44. **AUX 1 POWER RECEPTACLE -** Provides temperature control, tip ground sensing circuitry and finger switch connection from **THERMAL MANAGEMENT CENTER** to the auxiliary accessory connected to Auxiliary Channel 1. Foot pedal attachment to this receptacle will allow vacuum/ pressure pump operation through foot pedal actuation.

45. **AUX 2 POWER RECEPTACLE -** Provides temperature control, tip ground sensing circuitry and finger switch connection from **THERMAL MANAGEMENT CENTER** to the auxiliary accessory connected to Auxiliary Channel 2. Foot pedal attachment to this receptacle will allow vacuum/ pressure pump operation through foot pedal actuation.

46. **AUX 3 POWER RECEPTACLE -** Provides temperature control, tip ground sensing circuitry and finger switch connection from **THERMAL MANAGEMENT CENTER** to the auxiliary accessory connected to Auxiliary Channel 3. Foot pedal attachment to this receptacle will allow vacuum/ pressure pump operation through foot pedal actuation.

47. **FUSE F2 -** Provides overload protection for **CH 1**, **CH 2** and **CH 3** power receptacles.

48. **PIK PRESSURE PORT -** Low pressure output with quick connect fitting. Controlled by **PIK-VAC** Power Switch (front panel).

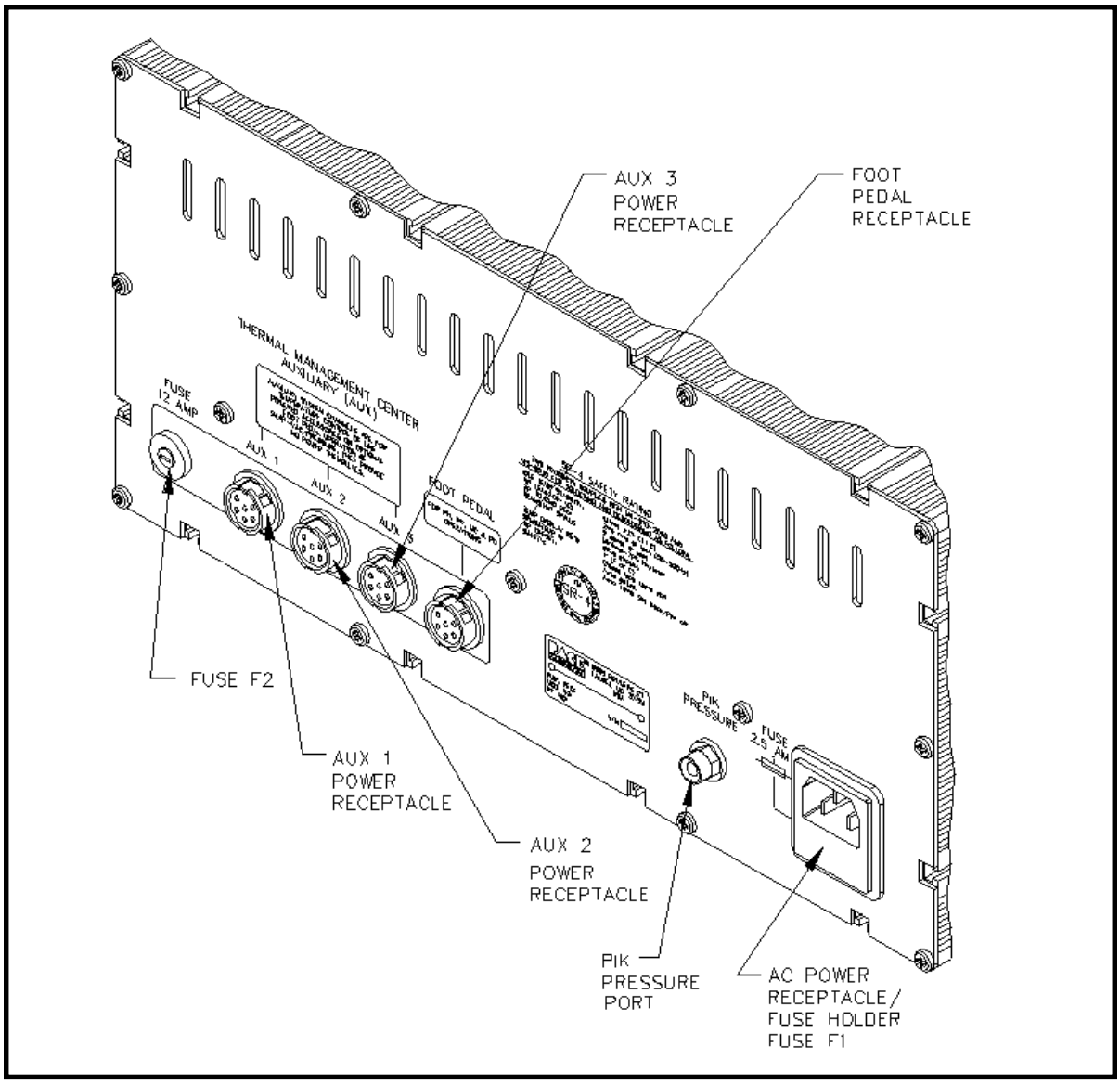


Figure 7. Rear Panel Parts I.D.

SAFETY

The purpose of this "SAFETY" section is to inform users of the heading guidelines used in this manual to indicate special Notes, Cautions, Warnings or Dangers. Also included are recommended precautions which must be observed when operating or servicing this product.

HEADING GUIDELINES

PACE adheres to the following Heading Guidelines (based on OSHA guidelines) when listing special information or precautions to be taken. Especially important are all procedures and practices which, if not strictly observed, could result in injury or loss of life.
These "NOTES", "CAUTIONS","WARNINGS" and "DANGERS" are inserted in this manual whenever deemed necessary. They appear in a blocked off form with double outline and a shaded background to highlight the information as shown below.

NOTE
XXXX

PRECAUTIONS

The following are general safety precautions which personnel must understand and follow when using or servicing this product. These precautions may or may not be included elsewhere in this manual.

USEAGE PRECAUTIONS

CAUTIONS

1. SensaTemp handpiece heaters and installed tips are hot when handpiece is powered on. DO NOT touch either the heater or tip. Severe burns may result! Always store handpiece in the appropriate cubby when not in use.

2. Always use this system in a well ventilated area. A fume extraction system such as those available from PACE are highly recommended to protect personnel from solder flux fumes.

3. Exercise proper precautions when using materials (e.g., fluxes & solder paste). Refer to the Material Safety Data Sheet (MSDS) supplied with each chemical and adhere to all safety precautions recommended by the manufacturer.

4. The use of Safety Glasses is recommended when plating or machining.

NOTES

1. The solder collection chamber in the PACE Sodr-X-Tractor is made of glass. Never remove this chamber using pliers. Breakage of the chamber may result. Always remove using the procedures recommended by PACE in the associated handpiece manual.

2. The glass solder collection chamber in the PACE Sodr-X-Tractor is hot when the handpiece is in use. When removing the chamber for cleaning, never touch the glass with bare hands. Allow the chamber to cool before cleaning.

3. Disconnect the MicroChine handpiece from the power source or turn the power switch off before installing or changing tools.

SAFETY

SERVICING PRECAUTIONS

DANGERS

POTENTIAL SHOCK HAZARD - Repair procedures performed on this product should be performed by qualified service personnel only. Line voltage parts will be exposed when equipment is disassembled. Service personnel must avoid contact with these parts when troubleshooting the power source.

NOTES

To insure continued peak performance, use genuine PACE replacement parts.

REPAIR PROCEDURE

The "REPAIR" section of this manual provides the technician with the information necessary to determine the source of a malfunction and take the necessary steps to correct it. In order to perform the most expedient repair, the technician must follow the process listed below step by step, in order. Failure to do so will make the diagnosis and repair much more difficult.

1. PERIODIC MAINTENANCE - No periodic or special maintenance is required on this system.
2. SERVICE HINTS - Read these helpful hints which give information on operation and troubleshooting.
3. CORRECTIVE MAINTENANCE - A guide for resolving malfunctions caused by improper maintenance or handpiece failure. Locate the "Symptom" in the "Corrective Maintenance" section which best describes the malfunction of the failed unit. Check each point described under "Solution" in order of listing.
4. CALIBRATION - Lists procedures for performing tip temperature tests to check handpieces. Perform these procedures periodically or if operating tip temperatures appear to be incorrect.
5. DISASSEMBLY/ASSEMBLY - Contains Disassembly/Assembly instructions which enables the technician to disassemble and assemble the unit properly.
6. FLOW CHARTS, SCHEMATICS - Easy to follow Flow Charts, Assembly Drawings, Schematics and Wiring Diagrams which enable the technician to determine the source of a malfunction down to an assembly (e.g., Main PCB Assembly) level. Locate the Flow Chart which best describes the malfunction of the failed unit. Follow the instructions on the Flow Chart and perform the checks indicated to determine the source of the malfunction. The schematics shown are for systems produced at the time of publication of this manual. If any variances in components or wiring are detected on your system contact PACE Customer Service for assistance (see step #7 below).
7. PACE CUSTOMER SERVICE - If the cause for the malfunction has not been determined at this point, call PACE Customer Service at TEL:(301) 490-9860, FAX (301) 604-9215.

WARNING

POTENTIAL SHOCK HAZARD Repair Procedures are to be performed by qualified service personnel only. Removal of the power source panels exposes line voltage parts. Service personnel must insure that the AC Power Cord is disconnected prior to disassembly.

REPAIR

SERVICE HINTS

1. OPERATIONAL PROBLEMS: Refer to the PACE Operation & Maintenance Manual (P/N 5050-0313) for complete operational instructions on use of this product. If a Password has been installed by the system user, remove the Password before proceeding with the repair. The user can reinstall the Password after the system is repaired.

2. VACUUM FAILURES: Failures of this nature can be caused by either the unit or the SensaTemp handpiece. Remove the Air Hose (and attached VisiFilter) from the **SNAP-VAC** Port and check for vacuum at the port. If sufficient vacuum is present, the malfunction exists in the handpiece. Further, if vacuum is sufficient at the port, check the vacuum level at the end of the glass solder collection chamber (Sodr-X-Tractor handpieces only, chamber must be checked cold). Take the applicable steps shown following.

   a) Handpiece Failures: Replace VisiFilter if necessary; clean heater bore and replace tip, check air hose for holes and ensure that glass solder collection chamber (Sodr-X-Tractor handpieces only) is properly seated against heater seal.

   b) Unit Failures: Remove the unit front panel (see "Disassembly/Assembly"). Check internal hosing for kinks and replace internal VisiFilter (attached to pressure port on motor pump assembly).

3. HEATING CONTROL CIRCUITS: Must be checked under load (with handpiece/s plugged in). The output(s) are obtained by switching triacs on and off. The voltage level to the handpiece(s) does not change when adjusting the Set Tip Temperature. The control circuit of the unit varies the duty cycle of voltage application as required to achieve and maintain the set temperature of the handpiece.

4. HEATING FAILURES: Usually caused by defective SensaTemp handpiece heaters. Refer to the "Heater Assembly Checkout Procedures", Table I. When checking the system power source, use a known good handpiece.

CORRECTIVE MAINTENANCE

VISIFILTER ELEMENT REPLACEMENT

Follow the procedure listed below to replace the VisiFilter element when it becomes clogged or discolored.

1. Disconnect the handpiece air hose by gently turning and pulling the coupled Fittings.
2. Disconnect the Visifilter and hose assembly from the Power Source by gently turning and pulling the male Fitting inserted into the **SNAP-VAC** Port.
3. Disconnect VisiFilter from both attached 1 inch air hoses by gently turning and pulling the VisiFilter while holding each of the hoses.
4. Separate the 2 plastic housing halves of the VisiFilter in the following manner.
   a) Grasp the VisiFilter in the palm of the hand with the Male Nib (air hose connection) marked "FLOW IN" facing you.
   b) Pull against one of the Wing Tabs while pulling on the Male Nib with the free hand to open the interconnection of the plastic housings at that Wing Tab.
   c) Pull against the second Wing Tab while pulling on the Male Nib to open the remaining interconnection and separate the plastic housings.
5. Remove the old or discolored Element and discard.
6. Insert the replacement VisiFilter Element into the housing marked "FLOW IN". Center the Element in the housing well.
7. Squeeze the 2 plastic housing halves together using 4 plastic Bumps on the housing marked "FLOW OUT" as pressure points. The 2 plastic housings will snap together and lock the VisiFilter Element in position.
8. Reconnect the 1 inch air hoses (removed in step 3) to the VisiFilter.
9. Attach VisiFilter and hose assembly to Power Source by inserting male Fitting into the **SNAP-VAC** Port.

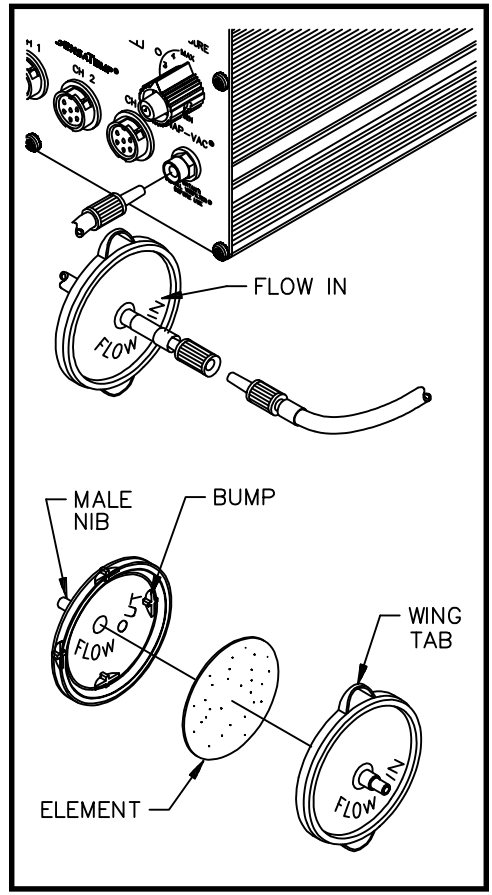


Figure 8. VisiFilter Element Replacement

SENSATEMP HANDPIECES

The following "Heater Assembly Checkout Procedures" are applicable to all PACE SensaTemp handpieces except for the TT-65 ThermoTweez handpiece. Refer to either of the TT-65 manuals (P/N 5050-0300 or 5050-0336) for troubleshooting procedures pertinent to that handpiece.

Perform the "Heater Assembly Checkout Procedures" shown below with the handpiece (and heater) at room temperature. If the handpiece is warm, resistance readings will be different from those shown.

SYMPTOM	CHECKOUT PROCEDURE	CAUSE	SOLUTION	HEATER SPECIFICATIONS
No heat	Check resistance - Pin 2 to Pin 5. Refer to handpiece manual for resistance tolerances. If resistance is high -	Open Heater	Replace Heater Assembly.	**SX-70 = 8 - 10 ohms** **SP-2A = 8 - 10 ohms** **SP-1A = 10 - 12 ohms** **TP-65 = 9 - 11 ohms** **TJ-70 = 6 - 8 ohms**
	Check resistance - Pin 3 to Pin 6. If circuit reads open -	Open Sensor	Replace Heater Assembly.	
Handpiece overheating	Check resistance - Pin 3 to Pin 6. Resistance should be 110 ohms. If circuit reads less than 105 ohms -	Shorted Sensor	Replace Heater Assembly.	
Fuse blows when unit is turned on.	Check resistance - Pin 2 to Pin 5. Refer to handpiece manual for resistance tolerances. If resistance is low -	Solder short in Handpiece.	Remove Short. Replace Heater Assembly & Fuse F1.	
		Shorted Heater	Replace Heater Assembly & Fuse F1.	
No Ground on Tip.	Check resistance - Pin 4 to a NEW Tip. Resistance should be less than 2 ohms. If not -	Oxidation buildup in Heater Bore.	Clean Heater Bore using appropriate wire brush.	
		Defective Heater	Replace Heater Assembly.	

Table I. Heater Assembly Checkout Procedures

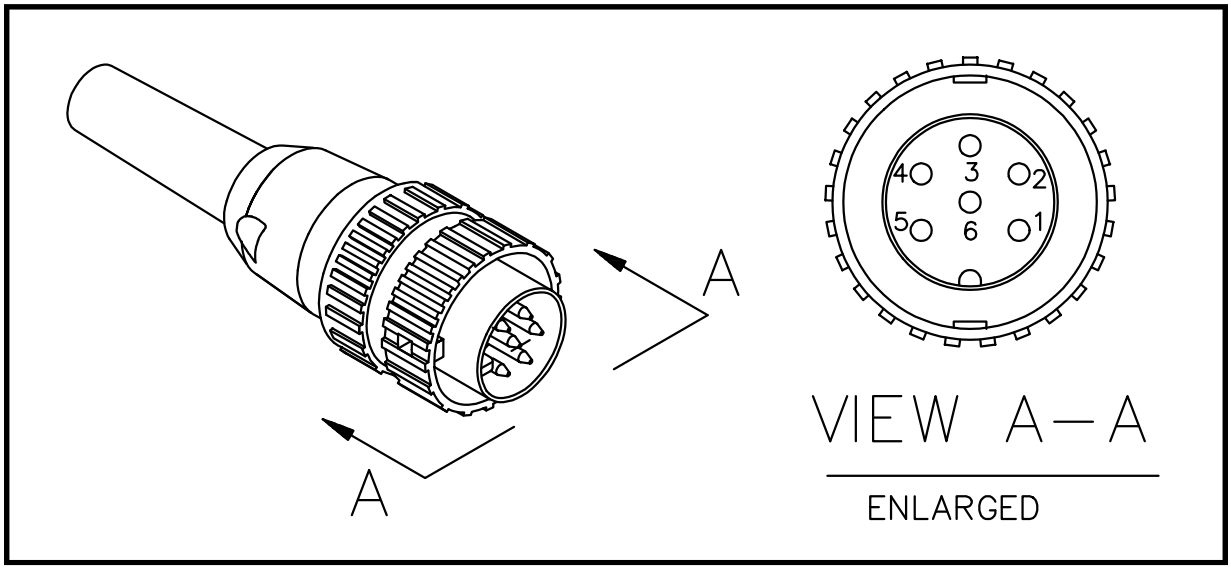


Figure 9. Connector Plug Wiring

MICROCHINE HANDPIECE

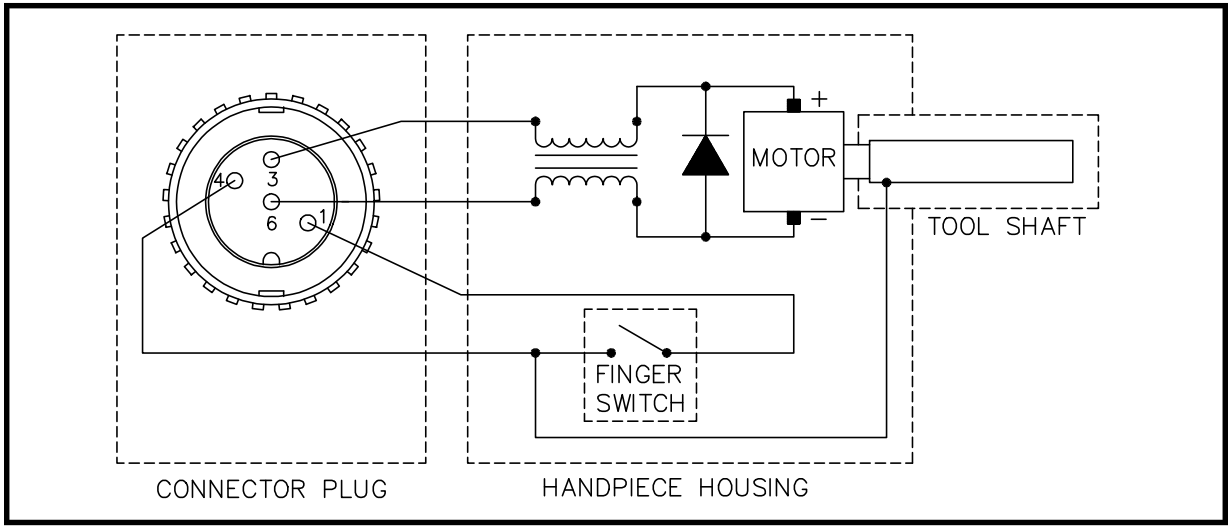


Figure 10. MicroChine Wiring

MICROCHINE HANDPIECE CONT'D

SYMPTOM	CHECKOUT PROCEDURE	CAUSE	SOLUTIO
Motor will not run. Status LED illuminated Red in color.	Unplug all SensaTemp handpieces. If motor now runs and Status LED turns off -	Shorted SensaTemp handpiece.	Repair shorted SensaTem handpiece.
Motor will not run. Status LED not illuminated Red in color.	Check resistance - Pin 1 to Pin 4 with Finger Switch depressed. If resistance is greater than 1 ohm -	Open Switch circuit.	Replace MicroChine Handpiece.
	Check resistance - Pin 3 to Pin 6. Resistance should be 3 to 40 ohms. If not -	Defective Motor circuit.	Replace MicroChine Handpiece.
Motor runs continuously.	Check resistance - Pin 1 to Pin 4. Resistance should read open circuit. If not -	Shorted Finger Switch.	Replace MicroChine Handpiece.
No Ground on tip of installed Tool.	Check resistance - Pin 4 to a NEW Tip. Resistance should be less than 2 ohms. If not -	Oxidation in drill collet.	Clean MicroChine Collet.
		Open ground circuit.	Replace MicroChine Handpiece.

Table II. MicroChine Handpiece Checkout Procedures

POWER SOURCE

Contact PACE Customer Service at Tel. (301) 490-9860, FAX (301) 604-9215 to obtain any replacement parts. Refer to the "Replacement Parts" section of this manual for part numbers.

SYMPTOM	PROBABLE CAUSE	SOLUTION
Digital Readout is blank. No functions on system.	Blown Fuse (F1)	Replace Fuse F1 located on rear of Power Source in the AC Receptacle.
E-1 displayed on Digital Readout.	All Channels are unplugged on Thermal Mgmt. Center.	Plug SensaTemp handpiece into CH 1, CH 2 OR CH 3.
	Open sensor in SensaTemp handpiece.	Refer to handpiece Operation Manual for Corrective Maintenance procedures.
E-2, E-3 or E-4 displayed on Digital Readout.	Defective heater assembly in SensaTemp handpiece.	Unplug all SensaTemp handpieces. Plug handpieces back in one at a time. When defective handpiece is connected, "E" code will be displayed. Refer to handpiece Operation Manual.
No heat on SensaTemp handpiece(s) at Thermal Management Center. Digital Readout displays very low temperature.	Open heater.	Refer to handpiece Operation Manual.
	Blown 12 Amp Fuse.	Replace 12 amp Fuse located on rear of Power Source.Disconnect all SensaTemp handpieces before powering system up. Plug SensaTemp handpieces back in one at a time. If the fuse blows when a handpiece is plugged in, the handpiece is shorted. Repair the handpiece.
	Handpieces connected to AUX receptacles. SensaTemp handpieces are not AUX compatible.	Disconnect incompatible handpieces from AUX Receptacles. Connect to Power Receptacles on front panel.
	Damaged Power Receptacle.	Replace Power Receptacle.
	System overload. Check for defective SensaTemp handpiece.	Disconnect defective handpiece. 220 Volt version only: Overtemp cutout in transformer may open. Allow transformer to cool.
	Microprocessor pcb defect.	Replace Microprocessor pcb.

Table III. Corrective Maintenance, Power Source

POWER SOURCE CONT'D

Contact PACE Customer Service at Tel. (301) 490-9860, FAX (301) 604-9215 to obtain any replacement parts. Refer to the "Replacement Parts" section of this manual for part numbers.

SYMPTOM	PROBABLE CAUSE	SOLUTION
Foot Pedal does not activate vacuum or air pressure for Thermal Management Center.	Foot Pedal connected to incorrect receptacle for Thermal Mgt. Center motor pump activation.	Connect Foot Pedal to any spare AUX Power Receptacle on Thermal Management Center.
	Defective Foot Pedal.	Check switch closure at Foot Pedal connector plug. Repair Foot Pedal if defective.
	Defective Motor Pump.	Replace Motor Pump.
	Microprocessor pcb defect.	Replace Microprocessor pcb.
Keys on Thermal Management Center don't function properly.	Key caps binding.	Clean and/or adjust Key caps.
	Display pcb misaligned or defective.	Replace Display pcb.
	Microprocessor pcb defect.	Replace Microprocessor pcb.
Cannot adjust Offset or Set Tip Temperature on Thermal Management Center. Digital Readout displays "P--".	System is requesting Password entry.	Enter Password.
	Operator forgot Password.	Clear Password. See "Clearing a Password" instructions.
Digital Readout on Thermal Management Center is inaccurate when using a known good handpiece.	System out of calibration.	Wait 4 minutes for system to perform automatic internal recalibration.
	Microprocessor pcb defect.	Replace Microprocessor pcb.

Table III. Corrective Maintenance, Power Source Cont'd

Contact PACE Customer Service at Tel. (301) 490-9860, FAX (301) 604-9215 to obtain any replacement parts. Refer to the "Replacement Parts" section of this manual for part numbers.

SYMPTOM	PROBABLE CAUSE	SOLUTION
Insufficient SNAP-VAC (vacuum) or air pressure. Excessive motor pump noise.	Air hose(s) and/or filter(s) clogged.	Replace any clogged filters and clear all air hoses.
	Defective motor pump.	Replace motor pump.
	Microprocessor pcb defect.	Replace Microprocessor pcb.
Digital Readout display is erratic.	Shorted handpiece or accessory.	Disconnect handpieces and accessories one at a time until Digital Readout display is normal.
	Low AC line voltage.	Check line voltage.
	Display pcb defect.	Replace Display pcb.
	Microprocessor pcb defect.	Replace Microprocessor pcb.
Paste dispenser pressure is insufficient or nonexistent.	Poor air hose connections.	Check air hose connections outside and inside of system power source.
	Clogged air filter.	Replace filter.
	Defective pump, valve or reservoir.	Replace defective part.
Excessive noise during paste dispense operation.	Defective dispense pump.	Replace dispense pump.
	Multifunction pcb defect.	Replace Multifunction pcb.

Table III. Corrective Maintenance, Power Source Cont'd

POWER SOURCE CONT'D

Contact PACE Customer Service at Tel. (301) 490-9860, FAX (301) 604-9215 to obtain any replacement parts. Refer to the "Replacement Parts" section of this manual for part numbers.

SYMPTOM	PROBABLE CAUSE	SOLUTION
MicroChine Status LED continuously illuminated Red in color.	Shorted SensaTemp handpiece or accessory on Thermal Management Center.	Turn system power OFF for 1 minute. Disconnect handpieces and accessories. Turn system power ON and run MicroChine. LED will turn off if the problem is caused by a handpiece or accessory. Repair handpiece or accessory.
	Multifunction pcb defect.	Replace Multifunction pcb.
MicroChine Probe Brake activates prematurely.	Probe Brake test lead is connected to or exciting a circuit having less than 500 ohms resistance to ground.	Remove ground lead from pcb.
MicroChine continues to run after release of finger switch or foot pedal.	Defective MicroChine handpiece.	Refer to Table II to check MicroChine handpiece. Replace MicroChine handpiece if defective.
MicroChine Probe Brake reacts sluggishly or is inoperable.	Probe Brake test lead is connected to inappropriate conductor on workpiece.	Connect Probe Brake test lead to proper conductor.
	Bit in MicroChine is not conductive (non metallic).	Install conductive bit.
	Defective MicroChine handpiece.	Replace handpiece.
	Multifunction pcb defective.	Replace Multifunction pcb.
MicroChine will not operate. Probe Brake LED is illuminated Green in color.	Damaged Power Receptacle.	Replace Power Receptacle.
	Defective MicroChine handpiece.	Replace handpiece.
	Multifunction pcb defective.	Replace Multifunction pcb.

Table III. Corrective Maintenance, Power Source Cont'd

Contact PACE Customer Service at Tel. (301) 490-9860, FAX (301) 604-9215 to obtain any replacement parts. Refer to the "Replacement Parts" section of this manual for part numbers.

SYMPTOM	PROBABLE CAUSE	SOLUTION
MicroChine speed is grossly inaccurate.	MicroChine is overloaded. Status LED is illuminated Yellow in color.	Disengage MicroChine from workpiece. Resume operation exerting less pressure on handpiece.
	Defective handpiece.	Replace handpiece.
	Multifunction pcb defect.	Replace Multifunction pcb.
Pik-Vac has insufficient vacuum.	"Low Pressure" output on power source rear panel is obstructed.	Remove obstruction.
	Defective Pik-Vac pump assembly.	Replace Pik-Vac pump.
Pulse Heat handpieces do not heat. Pulse Heat LED is illuminated Green in color.	Loose connection at Pulse Heat Outputs or handpiece connector.	Tighten connections.
	Defective Universal Power Cord.	Check voltage at Pulse Heat Outputs. Replace Universal Power Cord if defective.
	Multifunction pcb defect.	Replace Multifunction pcb.
Foot Pedal does not operate in PH, PP, MP or PD position.	Foot pedal connected to incorrect receptacle.	Connect foot pedal to receptacle on rear panel of power source marked "FOOT PEDAL".
	Defective foot pedal switch.	Check for switch closure at foot pedal connector plug pins. Repair foot pedal if defective.
	Multifunction pcb defect.	Replace Multifunction pcb.

Table III. Corrective Maintenance, Power Source Cont'd

REPAIR

CALIBRATION

All PACE SensaTemp controllers can be checked for calibration without the need to adjust any internal controls. If there is a requirement to check the actual tip temperature of a SensaTemp handpiece, perform the following procedure for attaching a thermocouple wire to the handpiece tip. A Process Monitor is available from PACE which will provide a temperature readout and can perform a variety of additional tests such as Tip to Ground resistance and vacuum checks.

A thermocouple may be attached to a tip by spot welding a thermocouple wire onto the end of the tip or by embedding the wire into a drilled hole at the tip end. Either method will produce accurate results. Tips (for PACE equipment) with embedded K type thermocouples are available from PACE.

Pulse Heat handpieces are not closed loop temperature controlled and require no calibration.

MATERIALS REQUIRED

1. **PACE Process Monitor or Temperature Meter**.
2. **Soldering Iron Tip**. Listed below are the available tips PACE uses (with and without embedded thermocouples).
   a) Use PACE part number 7021-0004-P1 tip with embedded thermocouple or tip only part number 1121-0337 on handpieces with 4.76 mm (3/16 inch) heater bore.
   b) Use PACE part number 7021-0003-P1 tip with embedded thermocouple or tip only part number 1121-0130 on handpieces with 3.18 mm (1/8 inch) heater bore.

NOTE
When using tips with embedded K type thermocouples supplied by PACE with a K type Temperature Meter, a PACE part number 1332-0164-P1 RCA to Omega-style, K-type, thermocouple adapter must be used.

The following items are needed if you are **NOT** using the PACE part number 7021-0003-P1 or 7021-0004-P1 embedded tips.

3. **Thermocouple**, 30 AWG ("K" type when using Process Monitor or type compatible with Temperature Meter).
4. **Copper Wedge** (used when embedding thermocouple) or 16 AWG Bare Copper Wire (1.22 mm (.048 inch) O.D.).
5. **Drill Bit** (used when embedding thermocouple), 1.5 mm (.059 inch) diameter.

SPOTWELDING PROCEDURE

1. Place the thermocouple end onto the tip just past the tinned end (approximately 6.35 mm (.25 inch)).
2. Spotweld the thermocouple to the tip. Check to insure that the thermocouple is properly attached to the tip.

EMBEDDING PROCEDURE

1. Drill a 1.5 mm (.059 inch) hole just past the tinned end of the soldering tip (approximately 6.35 mm (.25 inch) when using one of the recommended PACE tips). Drill to a depth of 2.54 mm (.100 inch).
2. Place the end of the thermocouple wire into the hole. Ensure that the end of the wire bottoms out in the hole.
3. Wedge the thermocouple into place using the copper wedge or bare copper wire. The thermocouple should be wedged as air tight as possible.

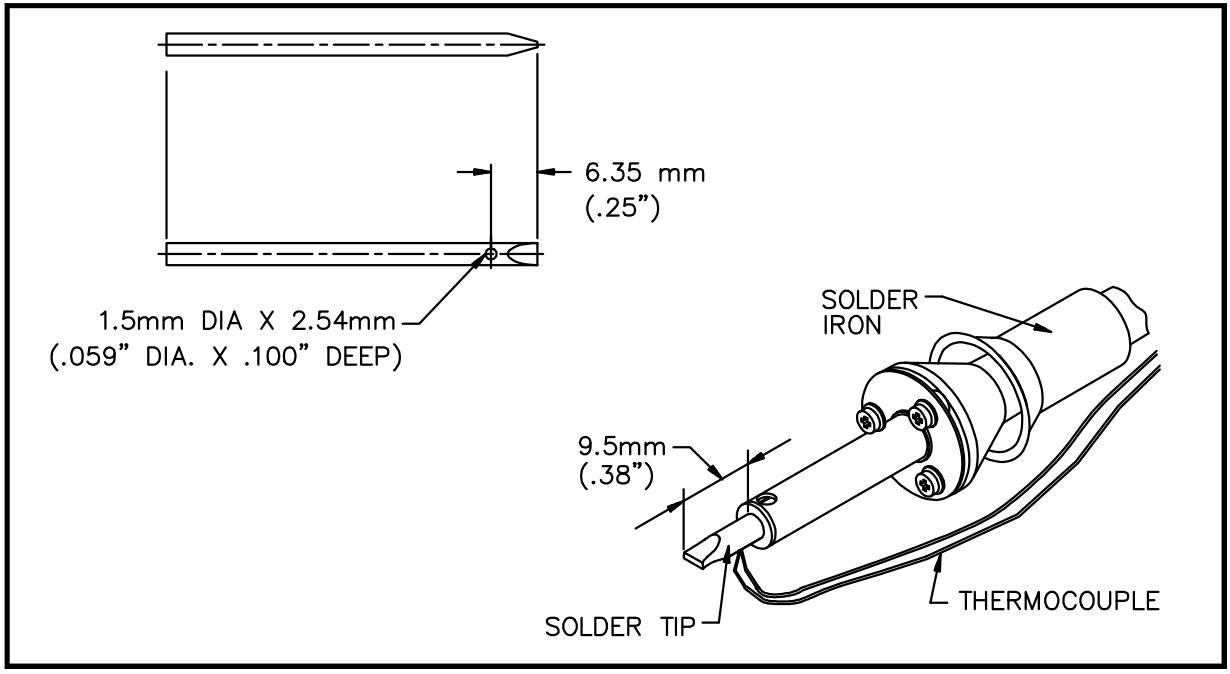


Figure 11. Thermocouple Attachment

TIP TEMPERATURE TEST

1. Install the tip into the handpiece to be tested with the end of the tip properly seated. The recommended PACE tips are shown extending out of the heater 9.5mm (3/8 inch).
2. Connect the free end of the thermocouple wire to the PACE Process Monitor (or temperature meter).
3. Apply power to the handpiece and allow temperature to stabilize.

REPAIR

DISASSEMBLY/ASSEMBLY

DISASSEMBLY

To disassemble the unit for servicing, perform the following procedure step by step, in sequence using the illustrations as a guide. The procedure directs the technician to remove the power source from the chassis.

WARNING

POTENTIAL SHOCK HAZARD The following procedures are to be performed by qualified service personnel only. Removal of the Power Source panels exposes line voltage parts. Service personnel must insure that the AC Power Cord is disconnected prior to disassembly.

1. Place the unit on a suitable work surface. Insure that the Power Cord has been disconnected from the back of the power source.

2. Position the PRC 2000 power source with the rear panel facing forward.

3. Remove the 3 rear panel mounting screws indicated on the rear panel. DO NOT remove any other rear panel mounting screws.

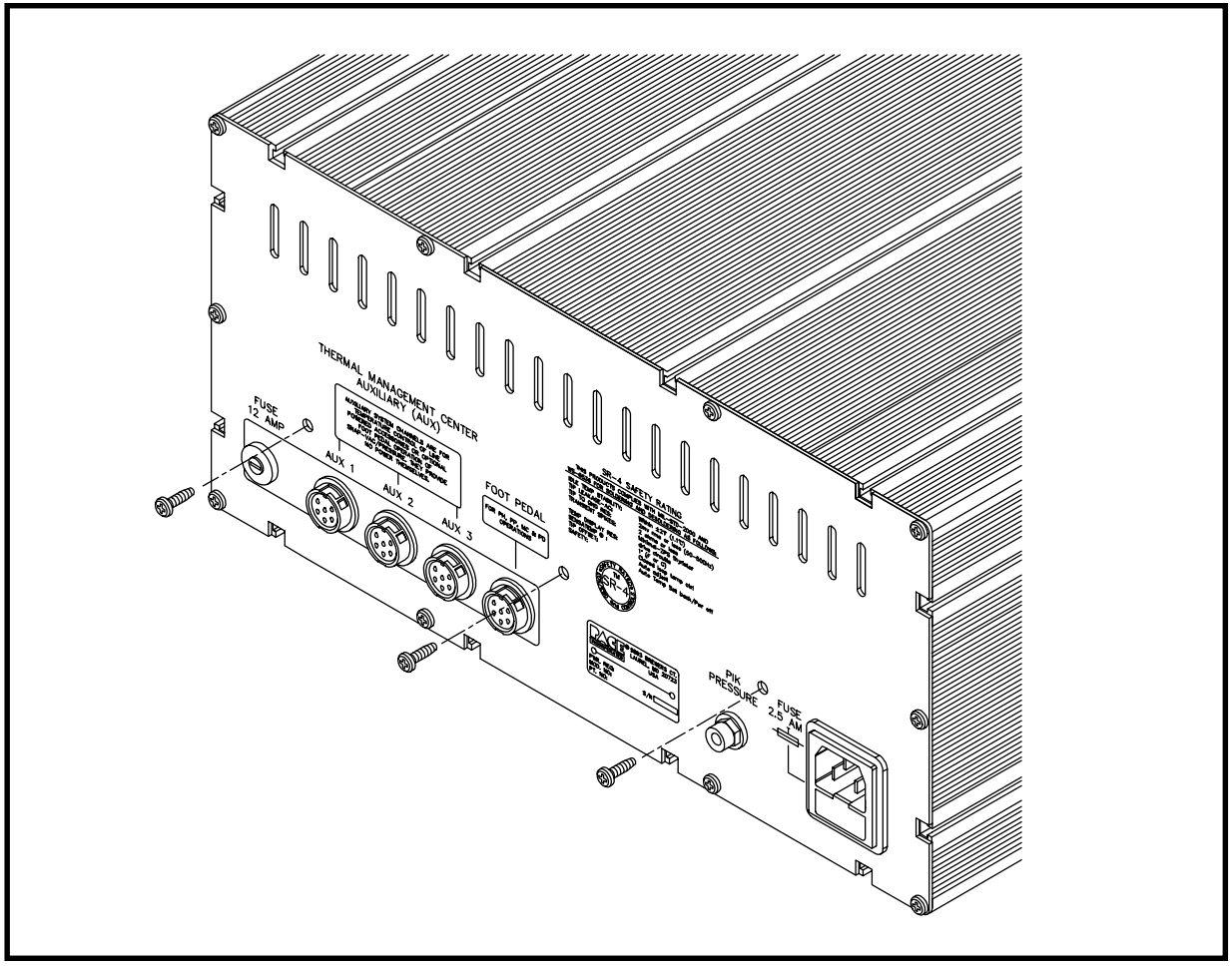


Figure 12. Removing Rear Panel Screws

DISASSEMBLY CONT'D

4. Reposition the unit with the Front Panel of the Power Source facing forward.

5. Remove the 10 Front Panel Mounting Screws.

6. Pull the Front Panel forward 2 inches to expose the interior of the Power Source. DO NOT disconnect any electrical or air hose connections.

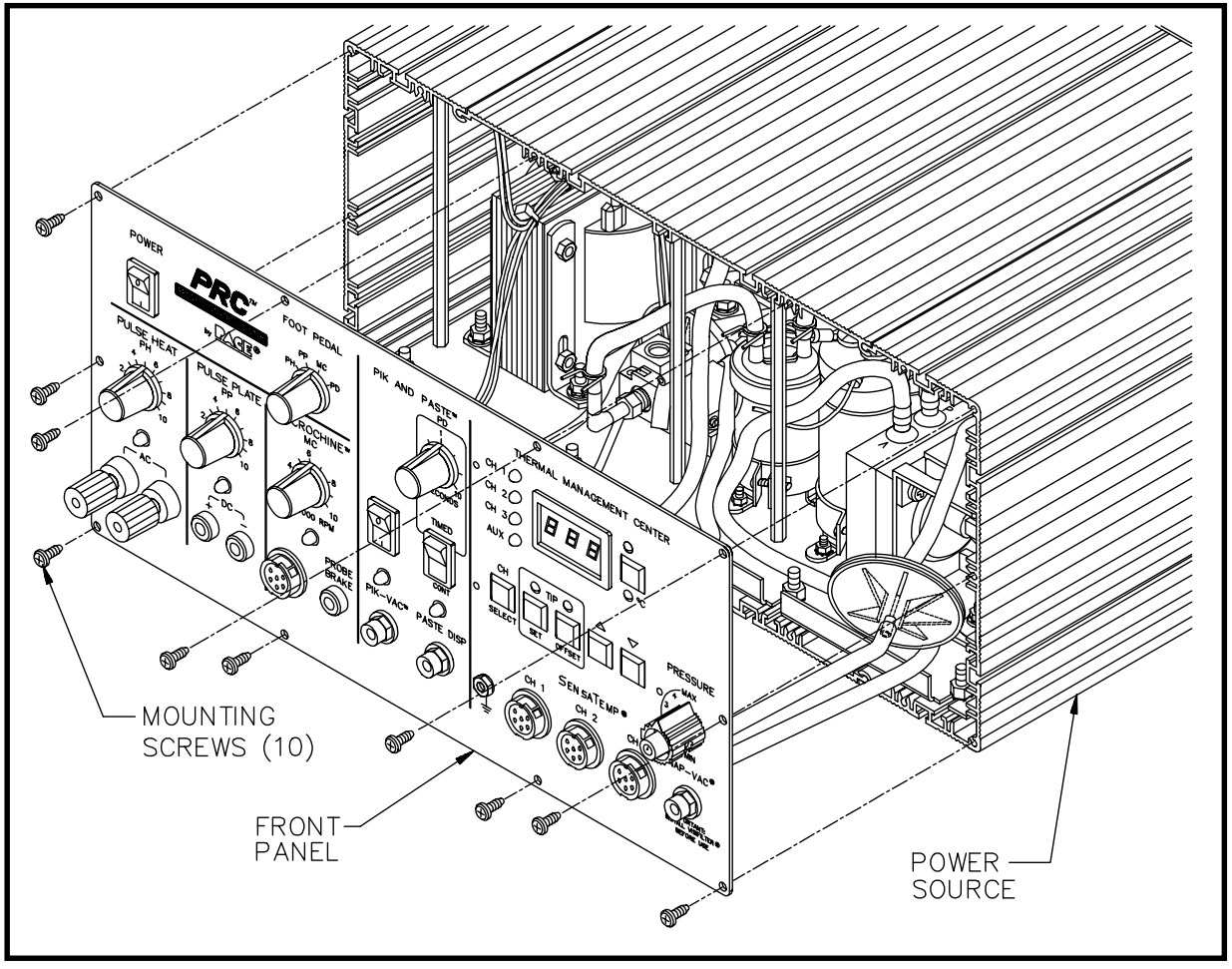


Figure 13. Removing Front Panel

7. Locate the 4 Bolt Assemblies across the front, inside, bottom edge of the Power Source case.

8. Loosen each of the Hex Nuts on the 4 Bolt Assemblies.

9. Slide each of the Bolt Assemblies forward and remove the assemblies from the Power Source.

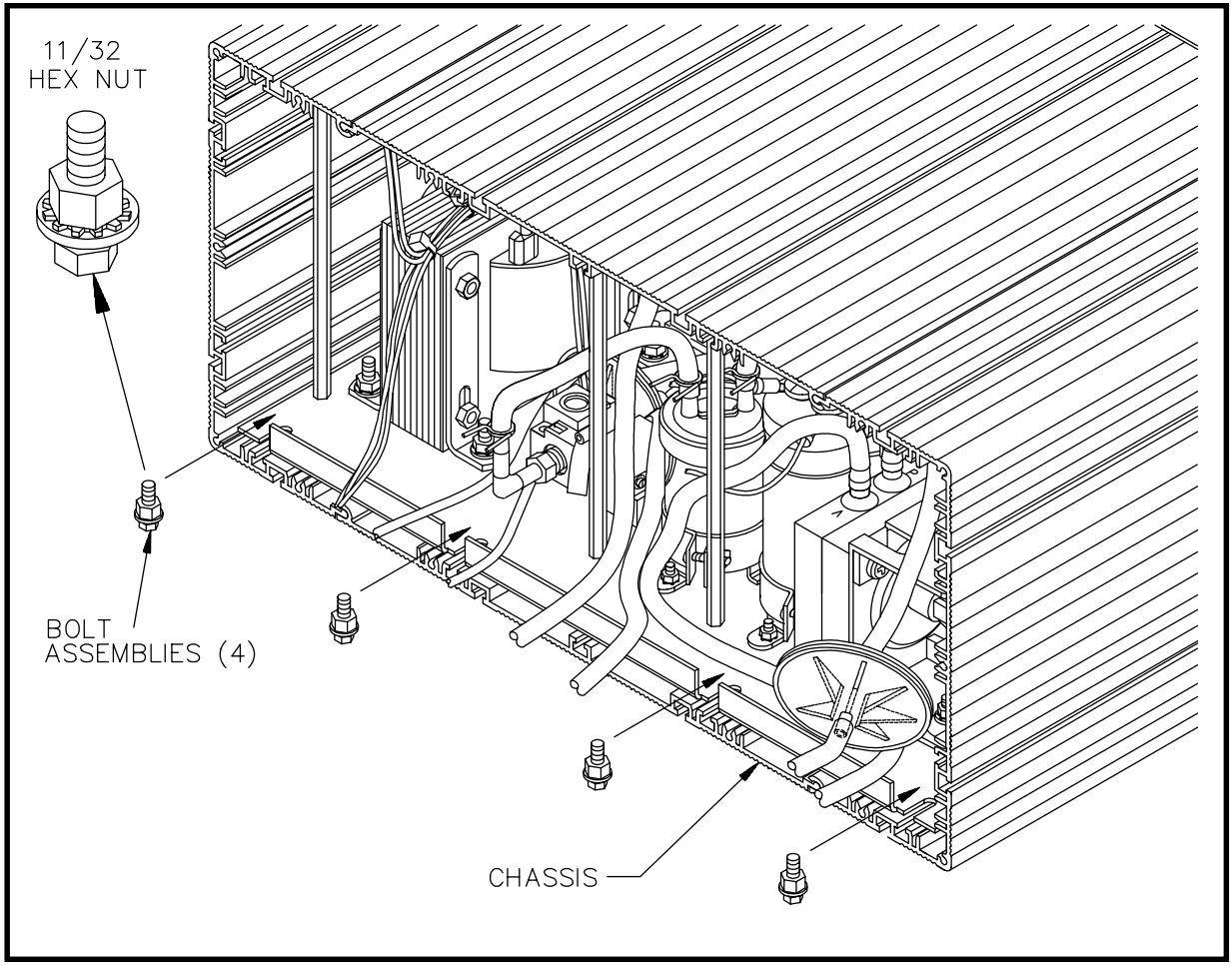


Figure 14. Removing Bolt Assemblies

DISASSEMBLY CONT'D

10. Remove the power source from the case by grasping 2 of the metal posts which connect the pc boards to the power source chassis. Pull the power source forward and out of the case.

11. Set the case aside.

12. The unit can now be connected to the house AC supply to troubleshoot the system.

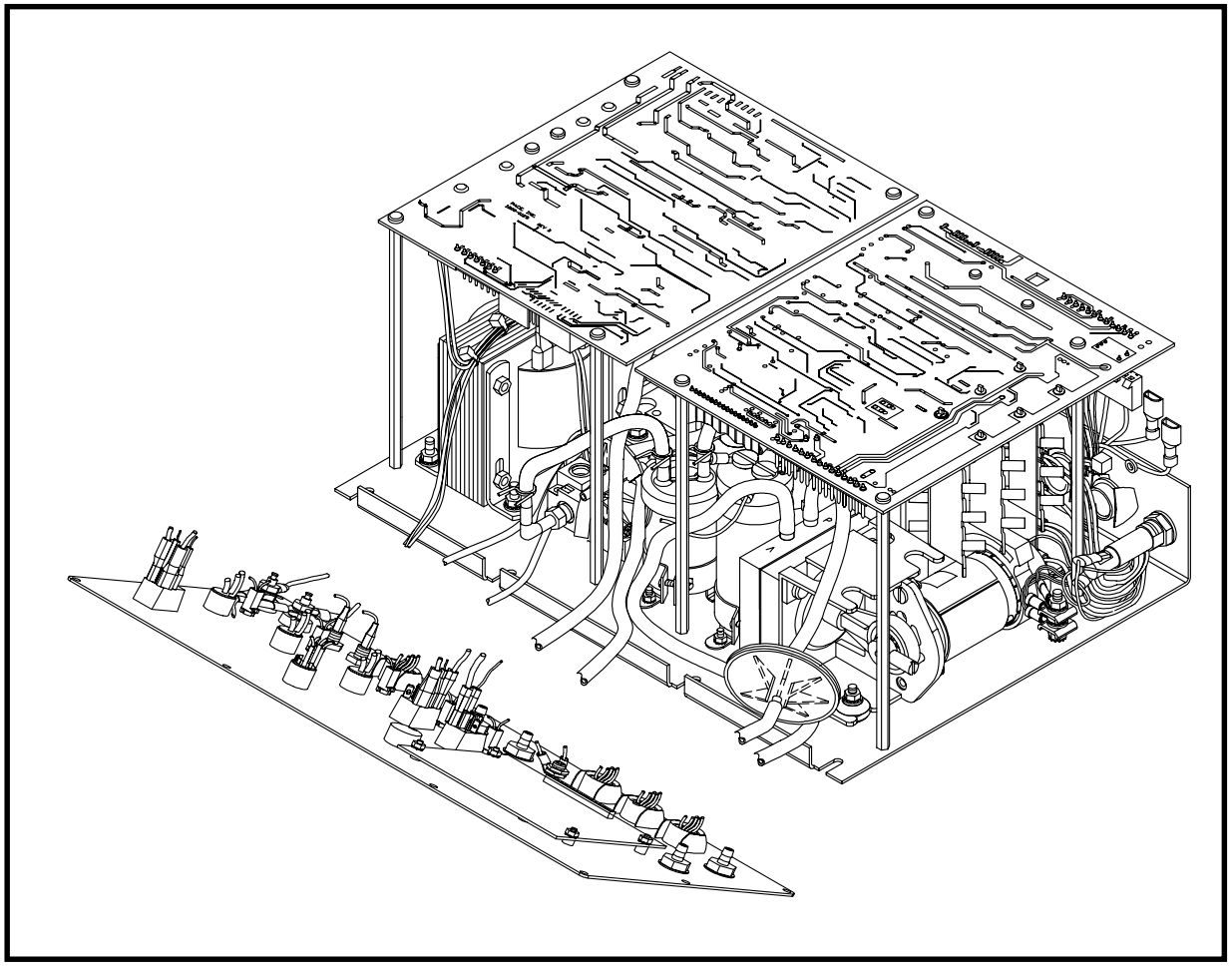


Figure 15. Removing Power Source From Case

ASSEMBLY

1. Disconnect the AC power cord.

WARNING

POTENTIAL SHOCK HAZARD Insure that the AC power is disconnected before proceeding to step 2.

2. Place the case directly behind the power source. Insure that the power source is facing forward.

3. Slide the power source back into the case.

4. Reposition the power source with the rear panel facing forward. Reinstall the 3 rear panel mounting screws.

5. Reposition the power source with the front panel facing forward. Reinstall the 4 bolt assemblies. Tighten the hex nuts on each bolt assembly to secure the power source in position.

6. Insure that all air hoses are properly connected to the front panel. Refer to the "Air Hose Routing" illustration.

7. Install the 10 front panel mounting screws to secure the panel to the case.

8. Check the power source for proper operation.

REPAIR

FLOW CHARTS

The following flow charts should be used to determine the source of a malfunction down to an assembly level. Locate the flow chart which best describes the malfunction. If you are unsure about which flow chart to use, begin with the "Power" flow chart which will direct you to the area of concern.

Insure that the power source has been removed from its case before performing the applicable procedure.

WARNING

POTENTIAL SHOCK HAZARD The following Flow Chart procedures are to be performed by qualified service personnel only. Line voltage parts are exposed. Service personnel must avoid contact with these parts when troubleshooting the power source.

POWER

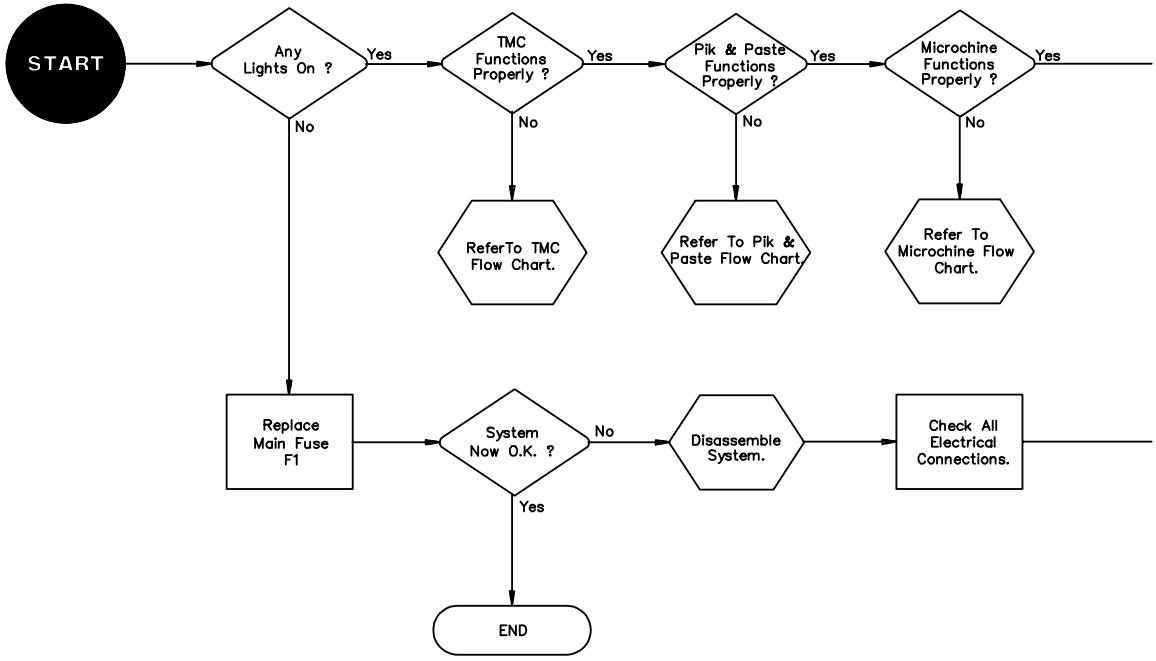
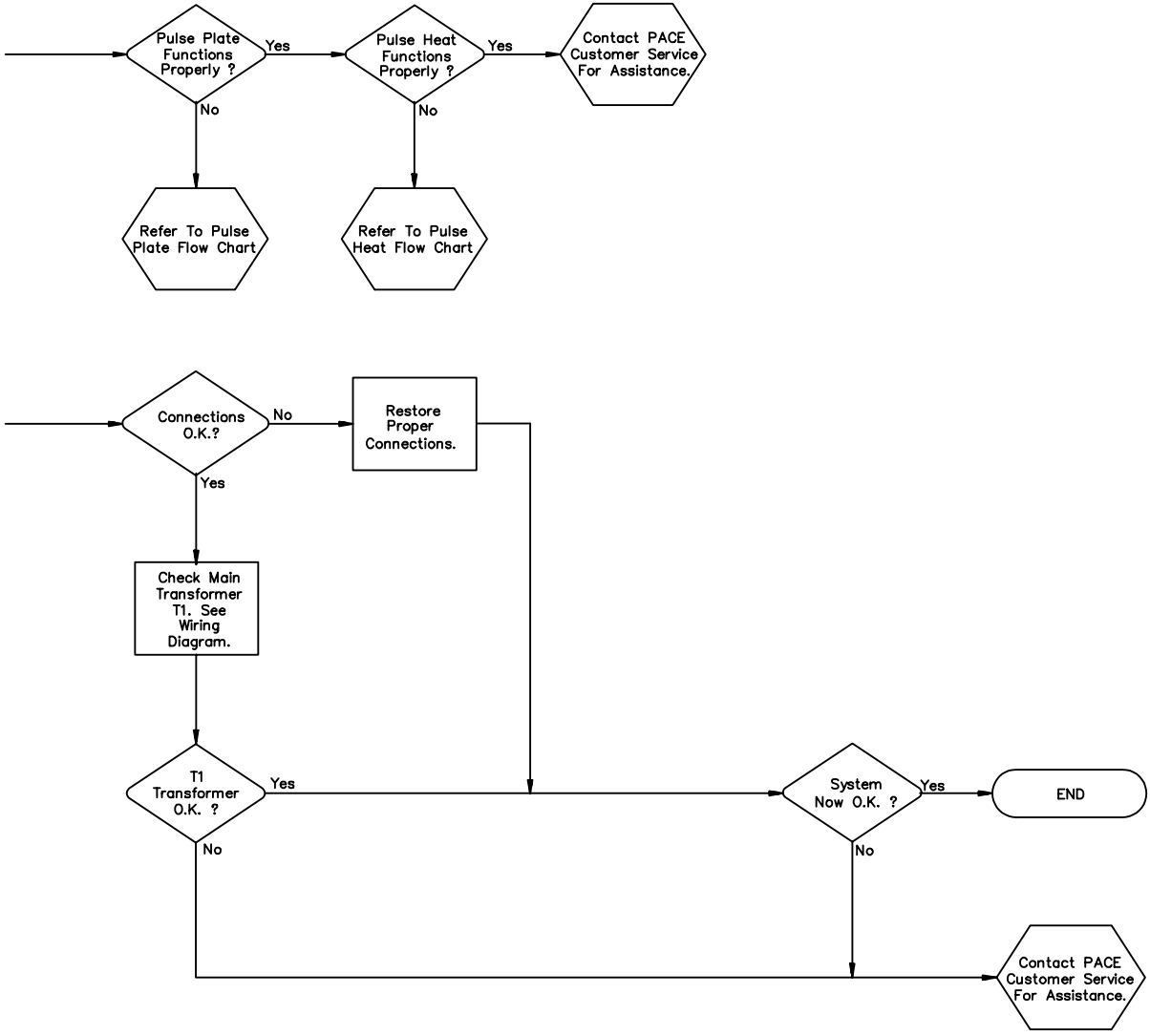


Figure 16. Power Flow Chart


Pulse Plate Functions Properly ?
Yes
Pulse Heat Functions Properly ?
Yes
Contact PACE Customer Service For Assistance.
No
No
Refer To Pulse Plate Flow Chart
Refer To Pulse Heat Flow Chart
Connections O.K.?
No
Restore Proper Connections.
Yes
Check Main Transformer T1. See Wiring Diagram.
T1 Transformer O.K. ?
Yes
System Now O.K. ?
Yes
END
No
No
Contact PACE Customer Service For Assistance.

TMC

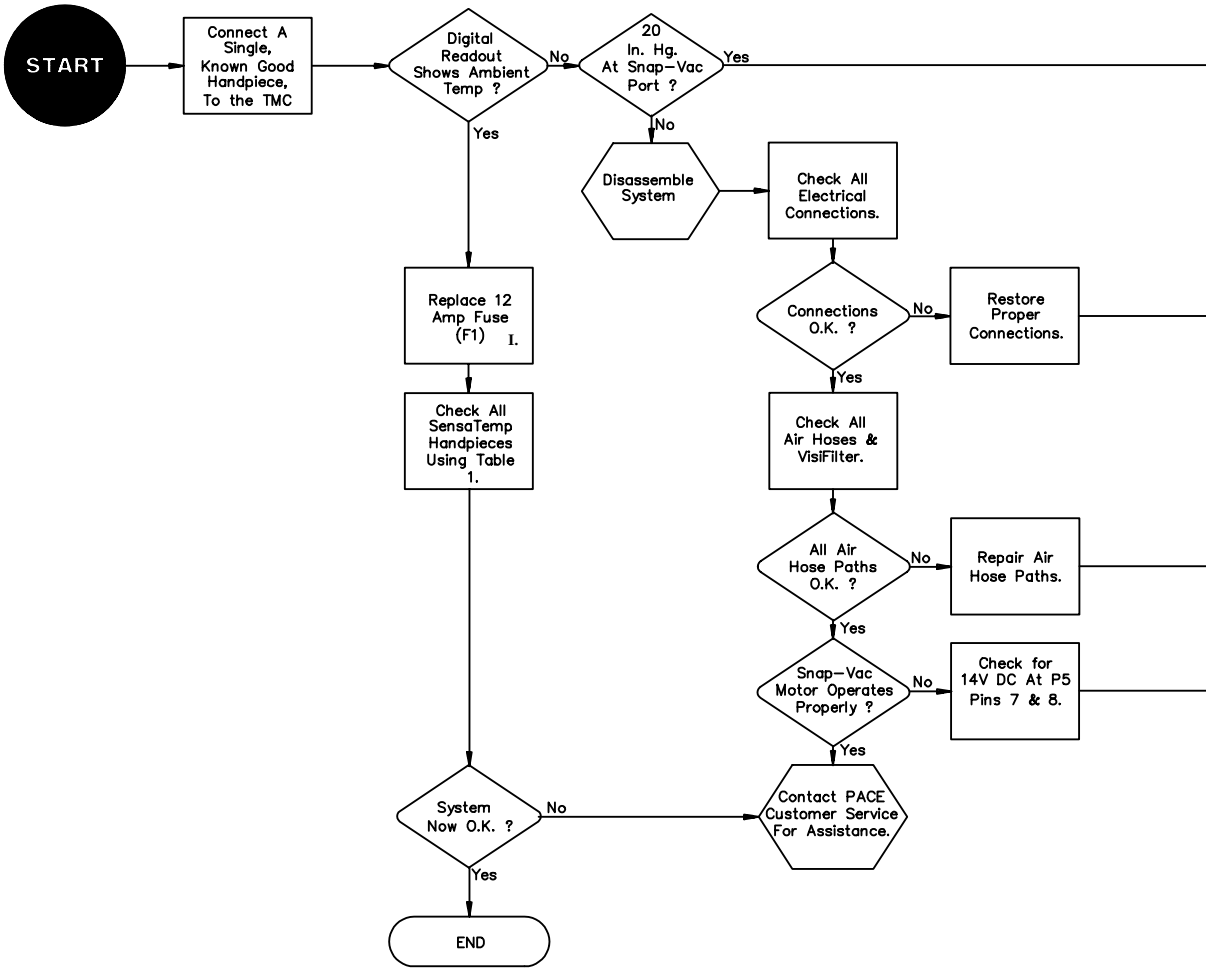
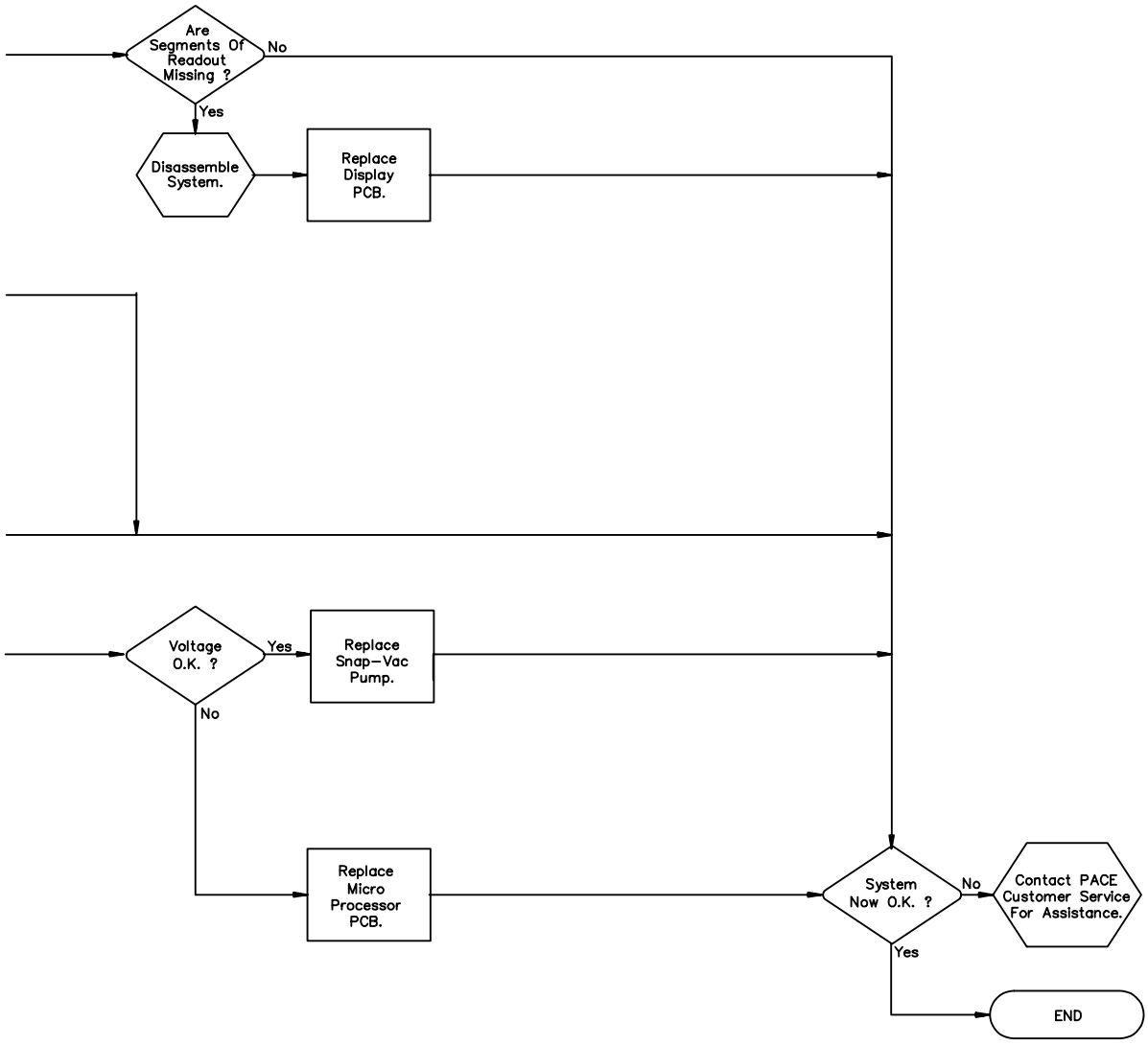


Figure 17. Thermal Management Center Malfunction Flow Chart


Are Segments Of Readout Missing ?
No
Yes
Disassemble System.
Replace Display PCB.
Voltage O.K. ?
Yes
Replace Snap–Vac Pump.
No
Replace Micro Processor PCB.
System Now O.K. ?
No
Contact PACE Customer Service For Assistance.
Yes
END

PIK & PASTE

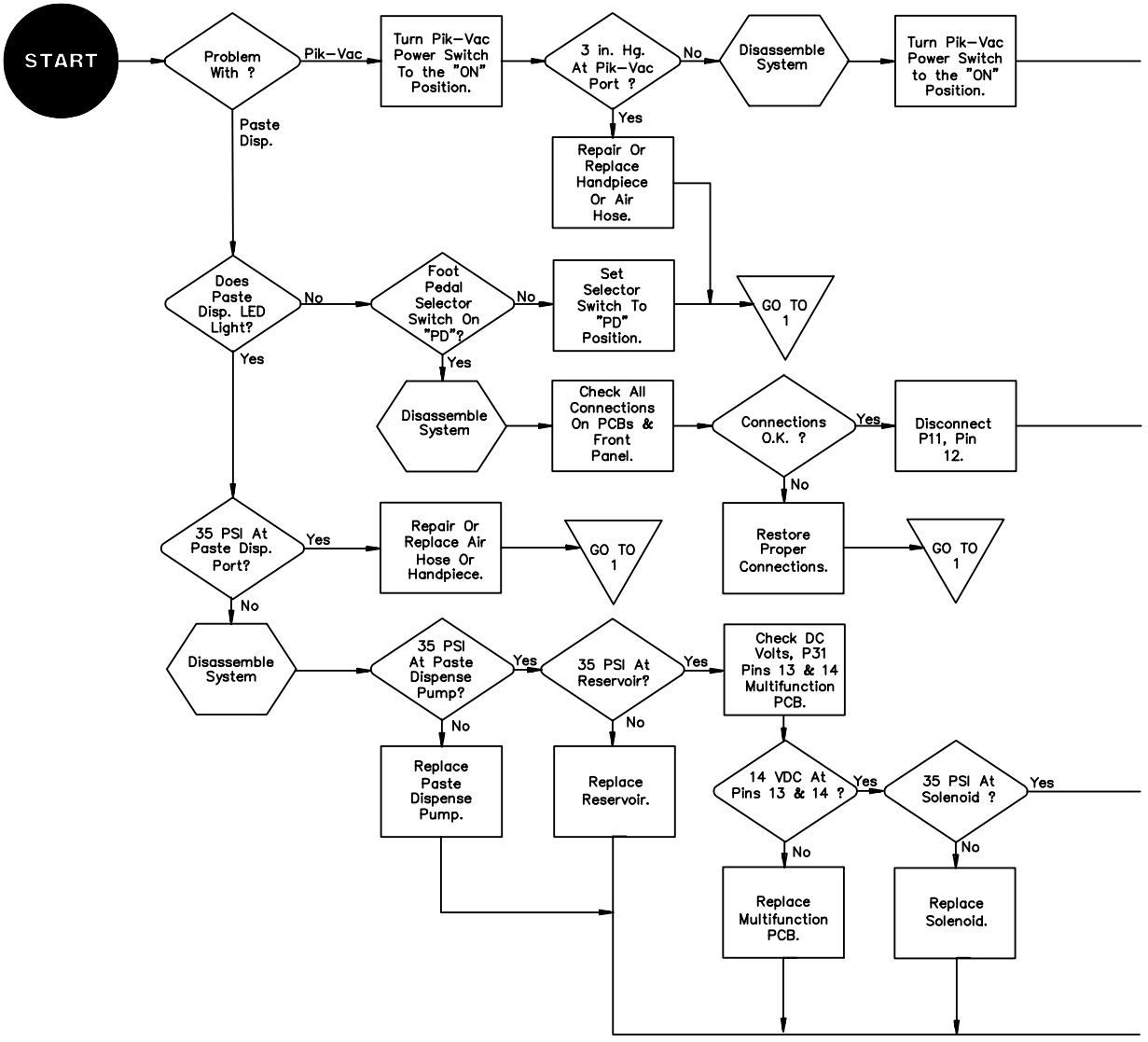
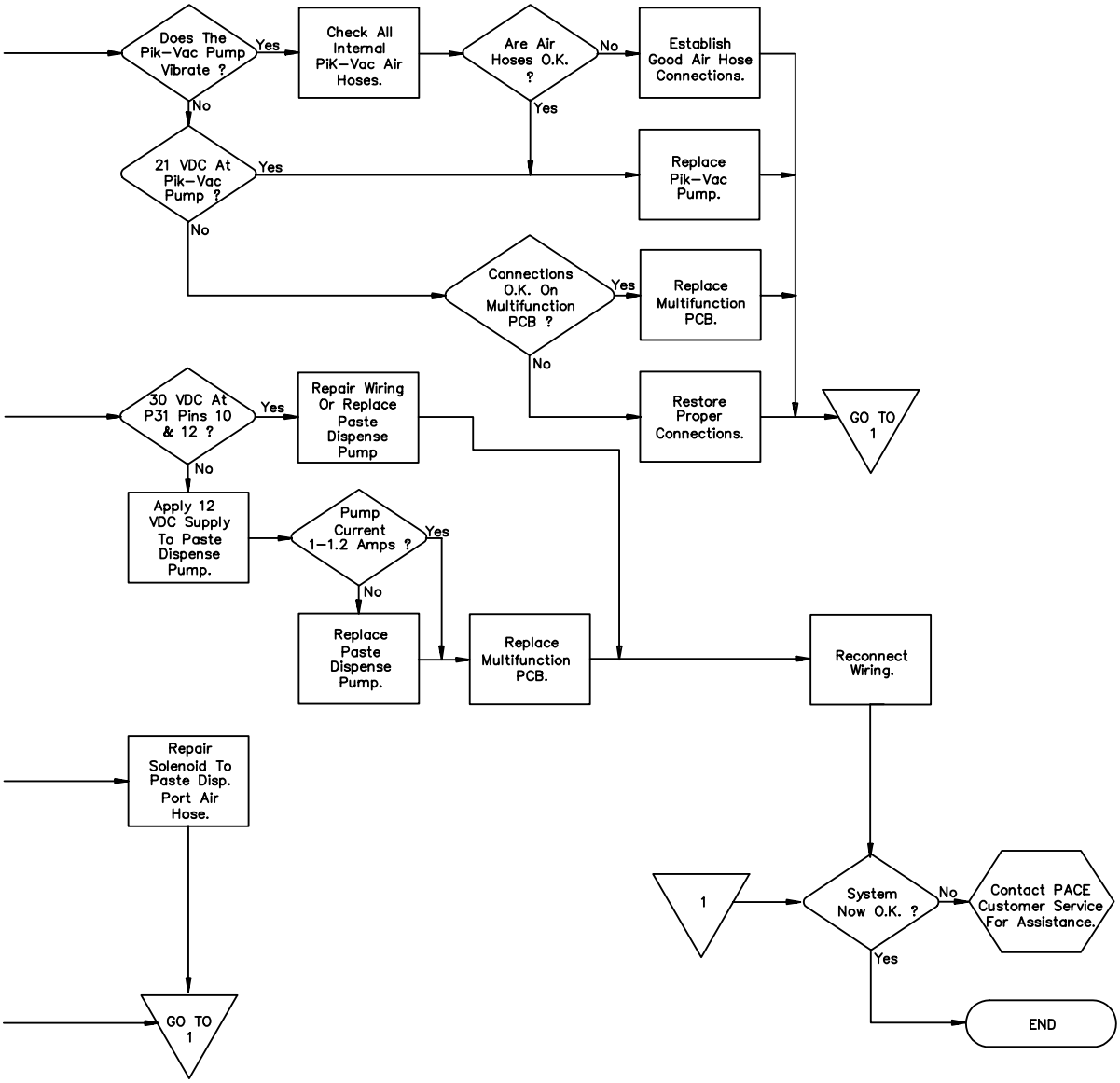


Figure 18. Pik & Paste Malfunction Flow Chart


Does The Pik–Vac Pump Vibrate ?
Yes
No
Check All Internal PiK–Vac Air Hoses.
Are Air Hoses O.K. ?
No
Yes
Establish Good Air Hose Connections.
21 VDC At Pik–Vac Pump ?
Yes
No
Replace Pik–Vac Pump.
Connections O.K. On Multifunction PCB ?
Yes
No
Replace Multifunction PCB.
Restore Proper Connections.
GO TO 1
30 VDC At P31 Pins 10 & 12 ?
Yes
No
Repair Wiring Or Replace Paste Dispense Pump
Apply 12 VDC Supply To Paste Dispense Pump.
Pump Current 1–1.2 Amps ?
Yes
No
Replace Paste Dispense Pump.
Replace Multifunction PCB.
Reconnect Wiring.
Repair Solenoid To Paste Disp. Port Air Hose.
GO TO 1
1
System Now O.K. ?
No
Yes
Contact PACE Customer Service For Assistance.
END

MICROCHINE

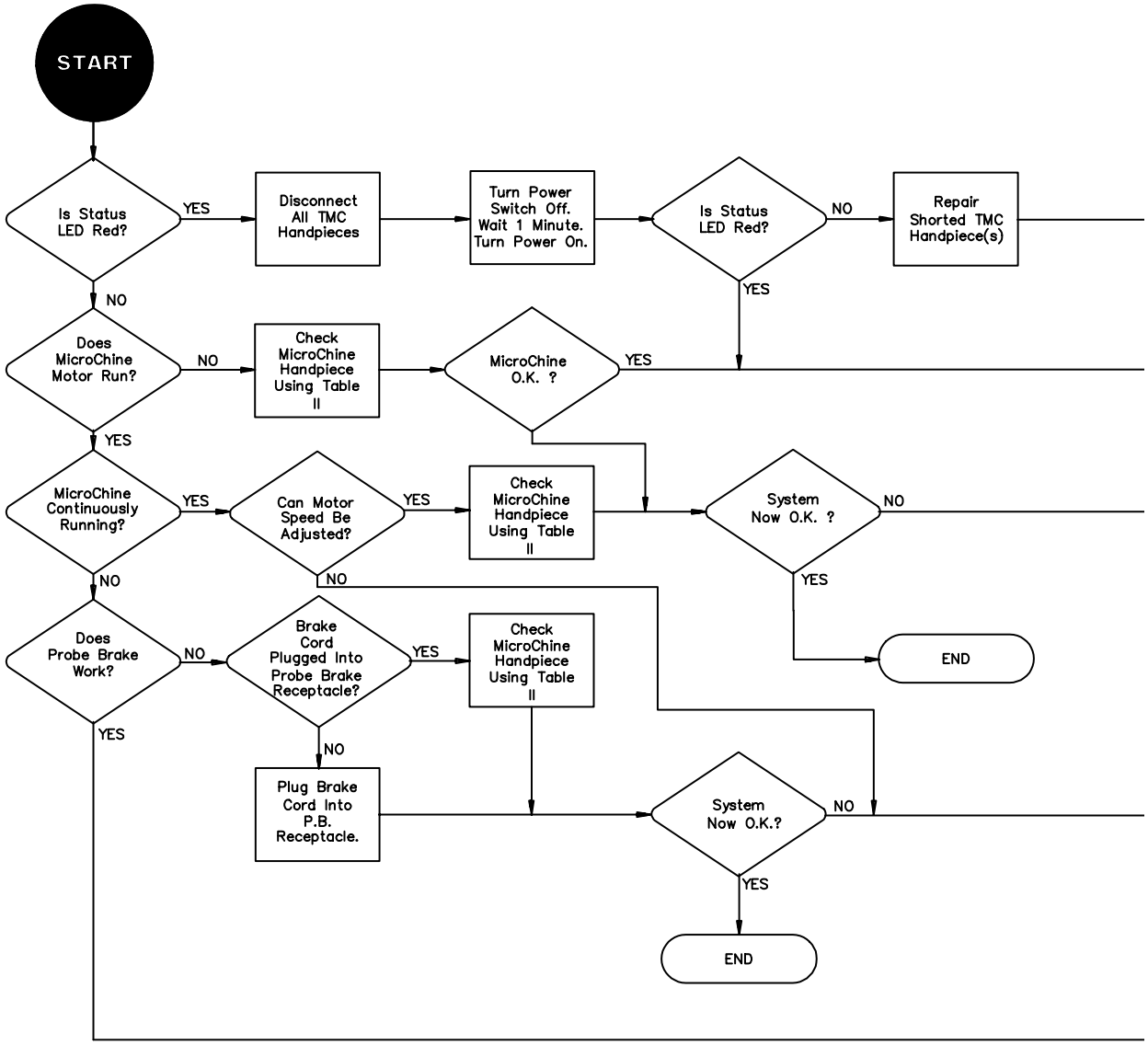
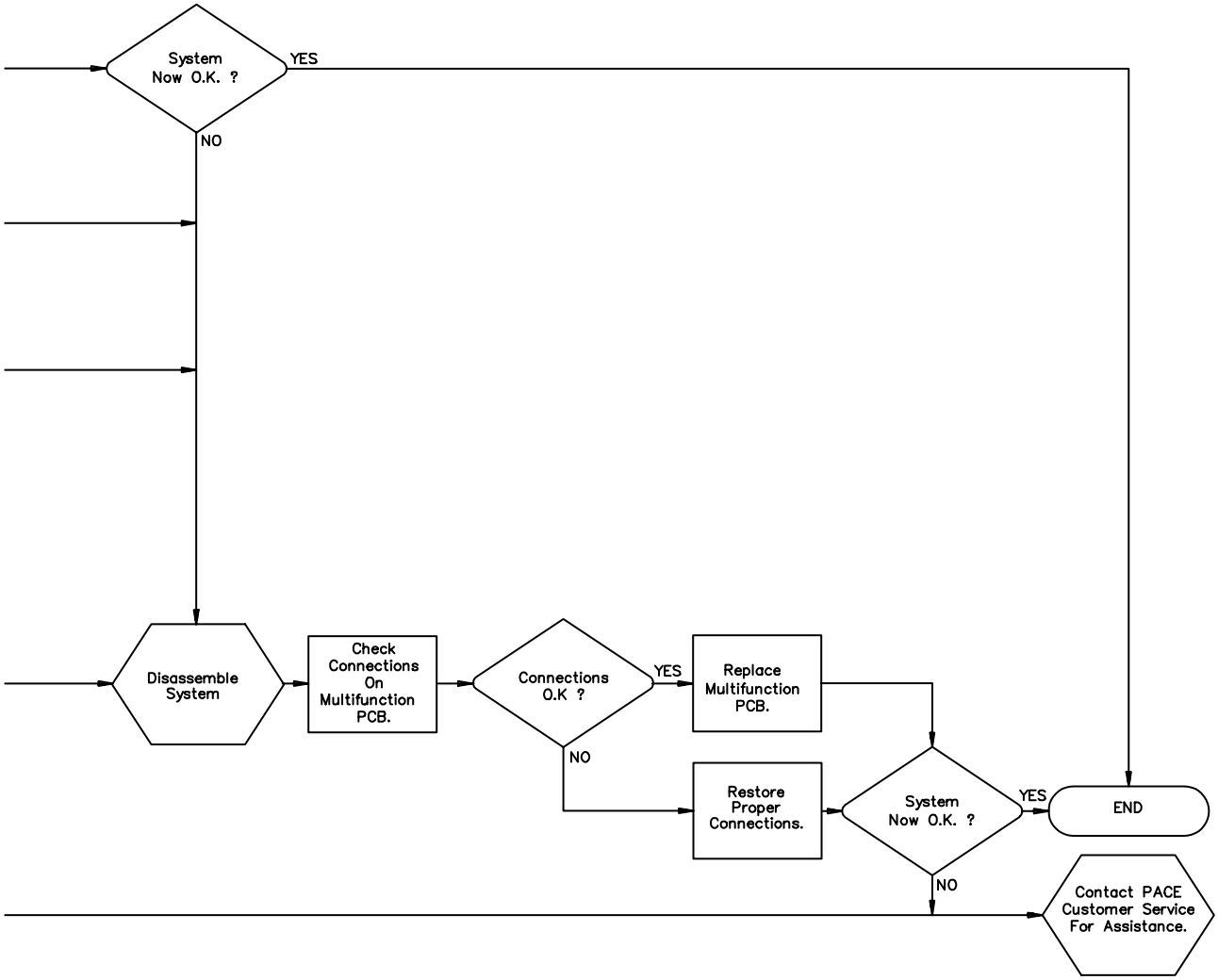


Figure 19. MicroChine Malfunction Flow Chart


System
Now O.K. ?
YES
NO
Disassemble
System
Check
Connections
On
Multifunction
PCB.
Connections
O.K ?
YES
Replace
Multifunction
PCB.
NO
Restore
Proper
Connections.
System
Now O.K. ?
YES
END
NO
Contact PACE
Customer Service
For Assistance.

PULSE PLATE

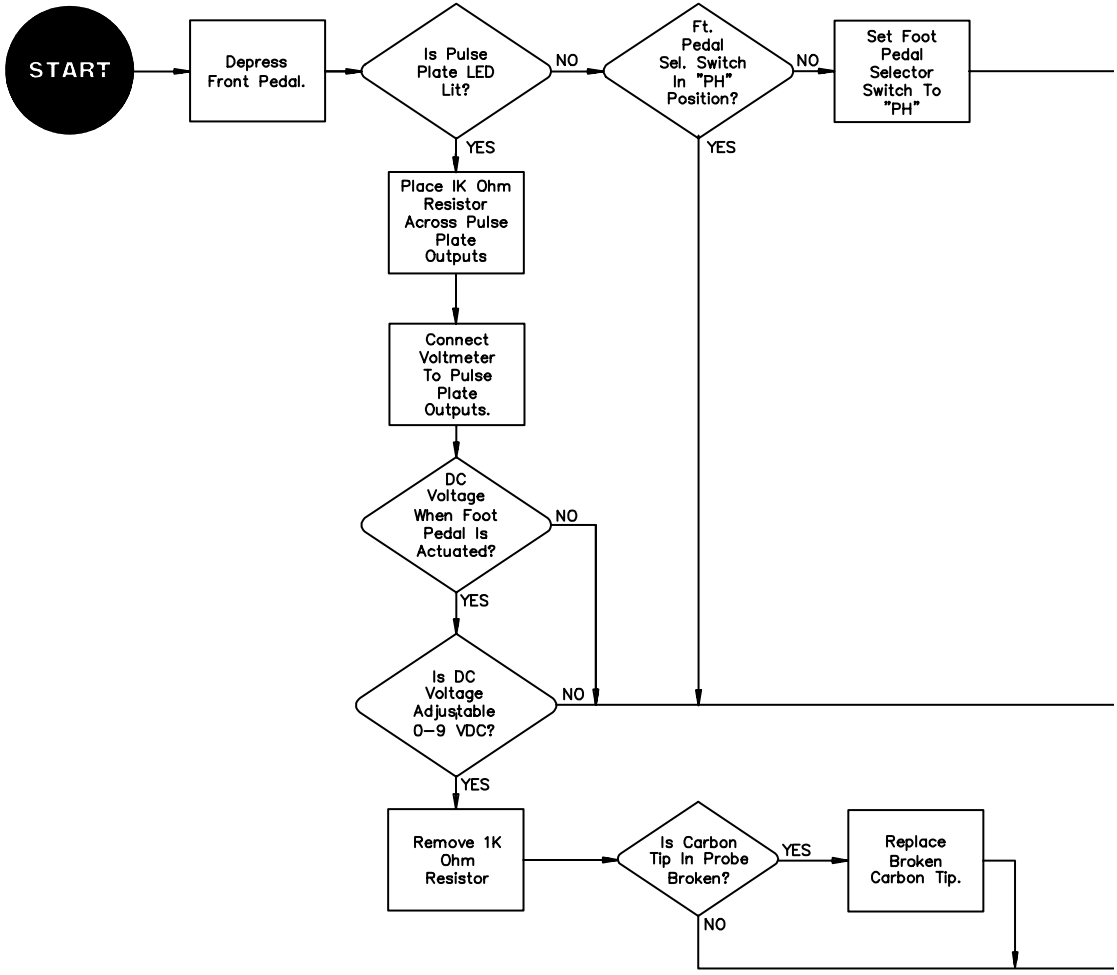
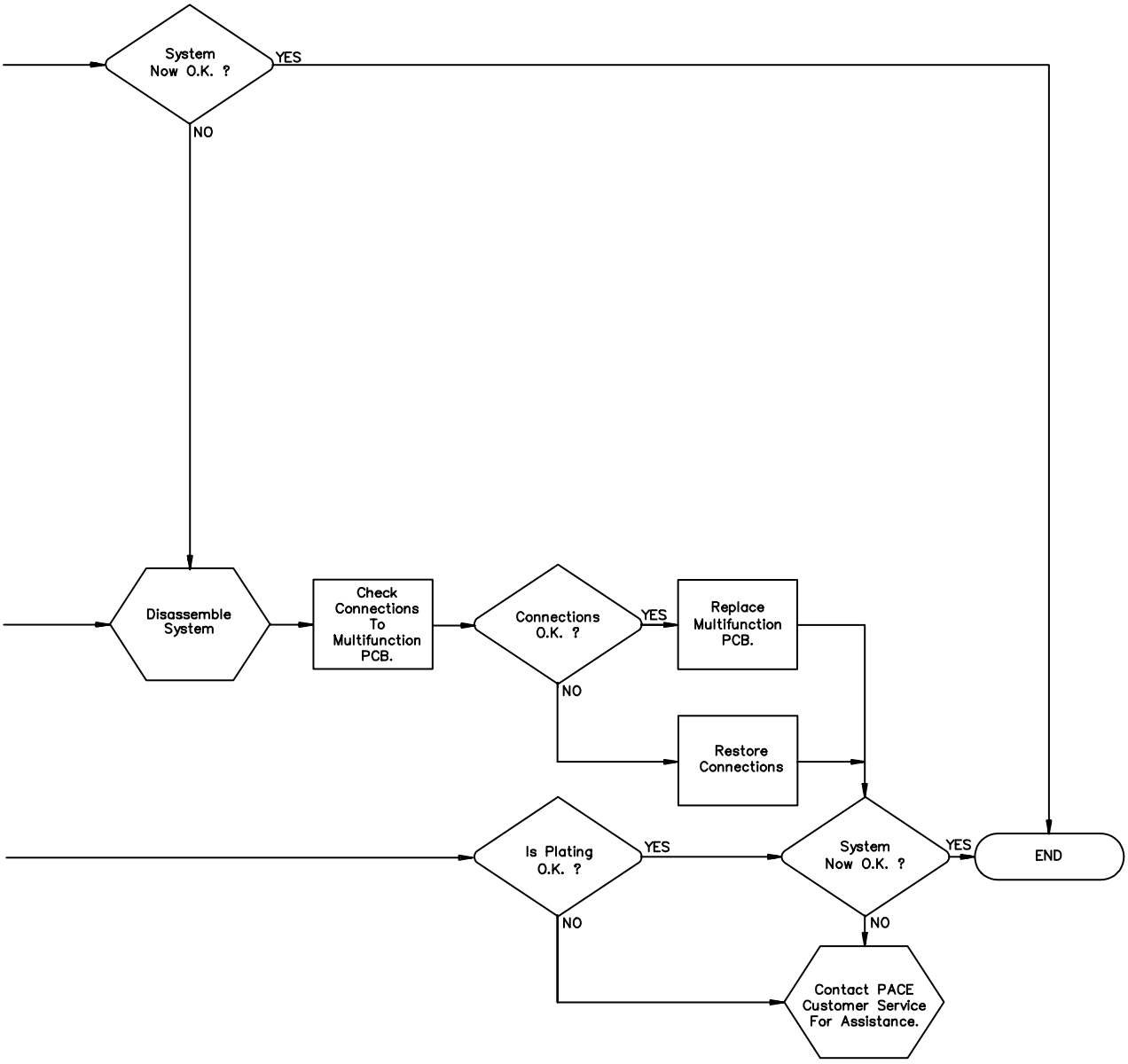


Figure 20. Pulse Plate Malfunction Flow Chart


System
Now O.K. ?
YES
NO
Disassemble
System
Check
Connections
To
Multifunction
PCB.
Connections
O.K. ?
YES
Replace
Multifunction
PCB.
NO
Restore
Connections
Is Plating
O.K. ?
YES
System
Now O.K. ?
YES
END
NO
NO
Contact PACE
Customer Service
For Assistance.

PULSE HEAT

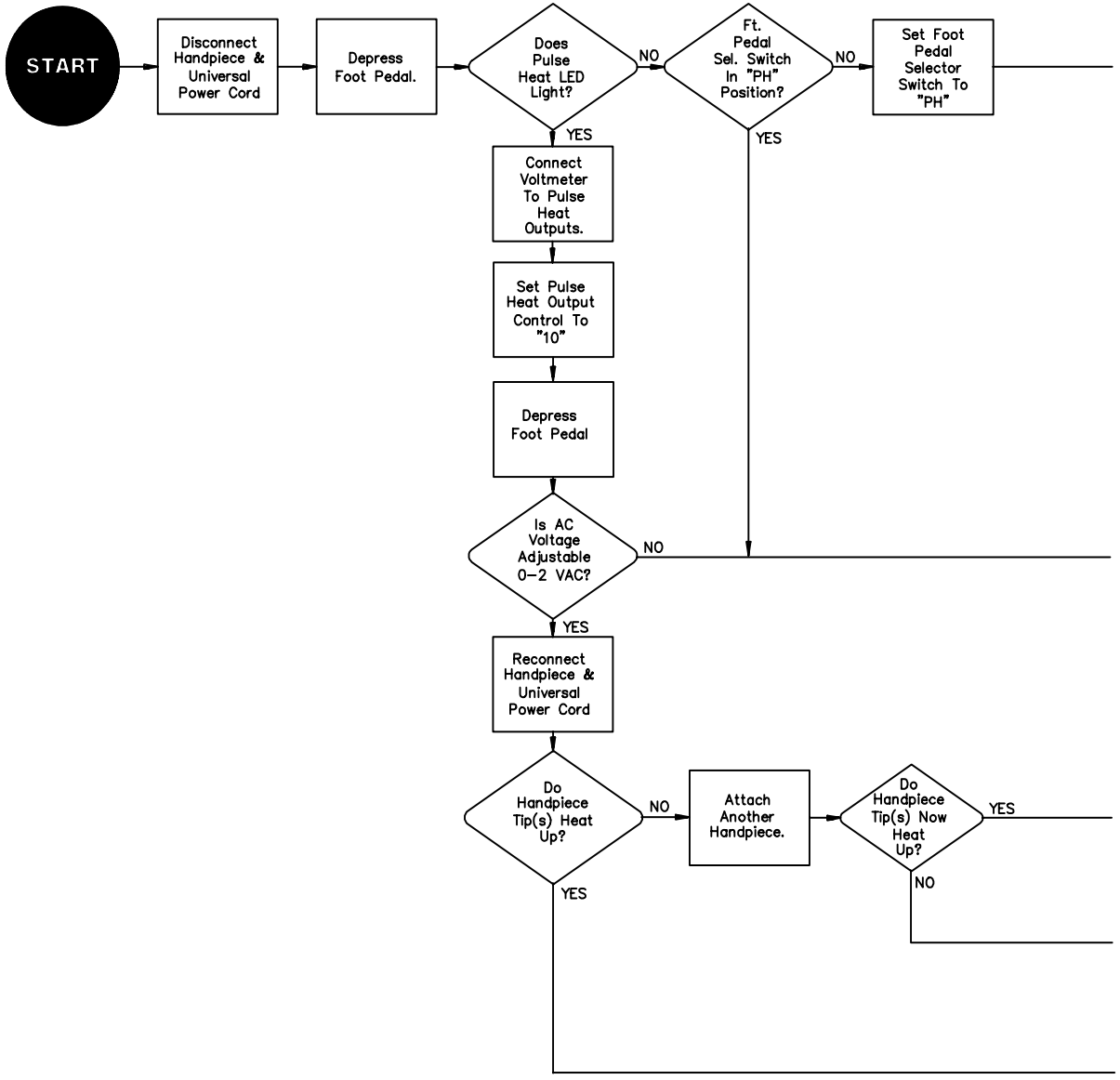
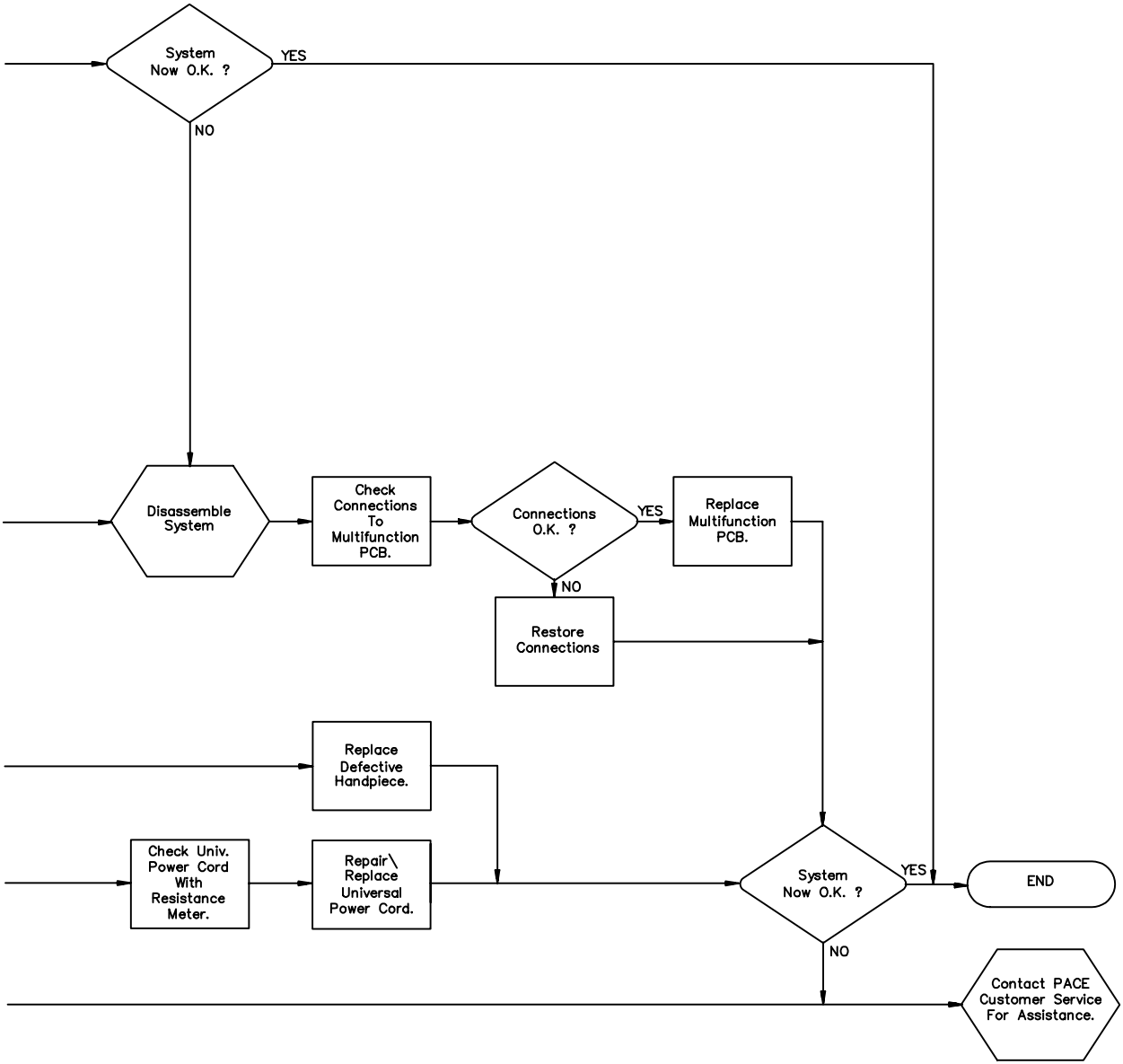


Figure 21. Pulse Heat Malfunction Flow Chart


System Now O.K. ?
YES
NO
Disassemble System
Check Connections To Multifunction PCB.
Connections O.K. ?
YES
Replace Multifunction PCB.
NO
Restore Connections
Replace Defective Handpiece.
Check Univ. Power Cord With Resistance Meter.
Repair\ Replace Universal Power Cord.
System Now O.K. ?
YES
END
NO
Contact PACE Customer Service For Assistance.

WIRING DIAGRAM

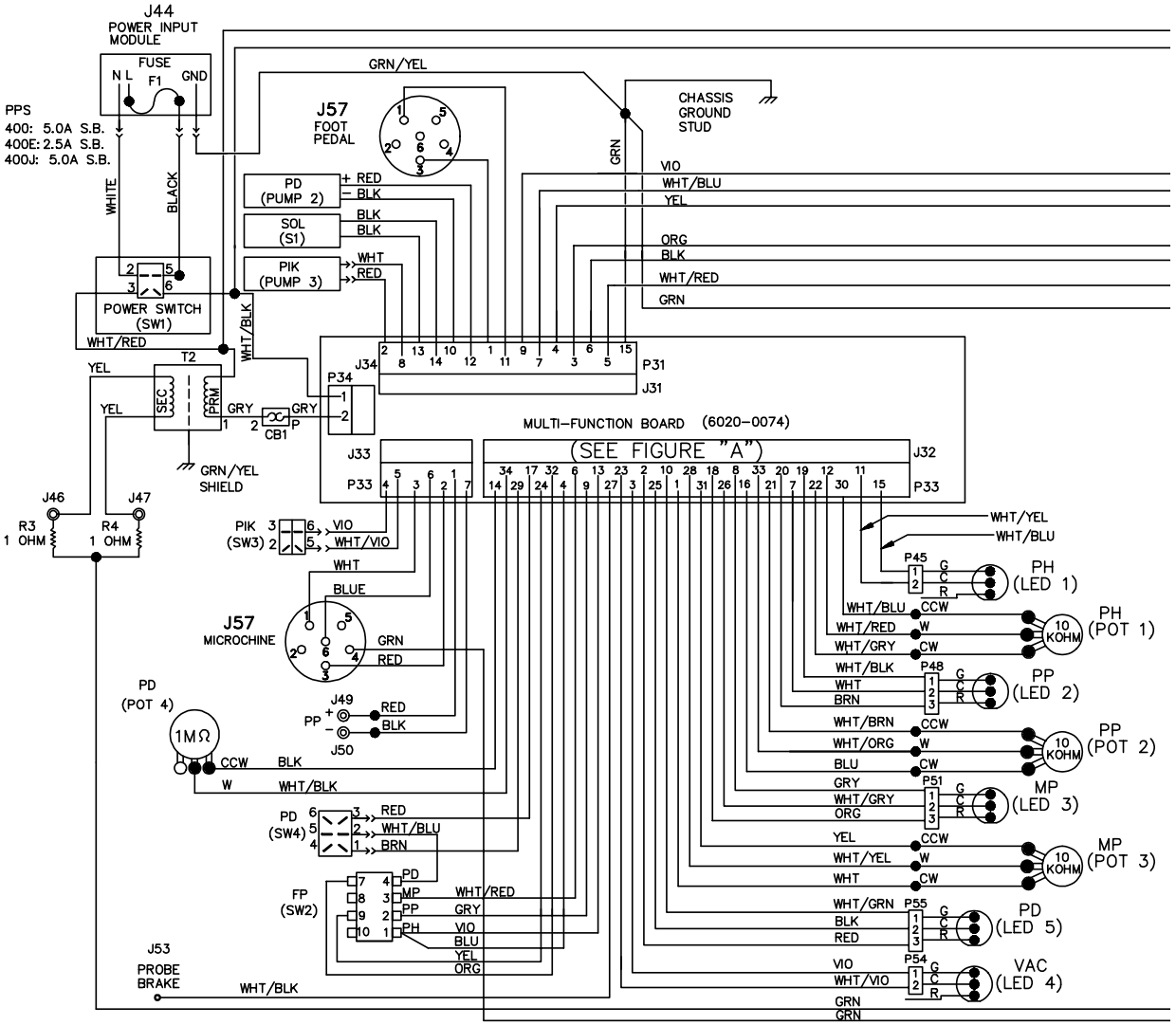
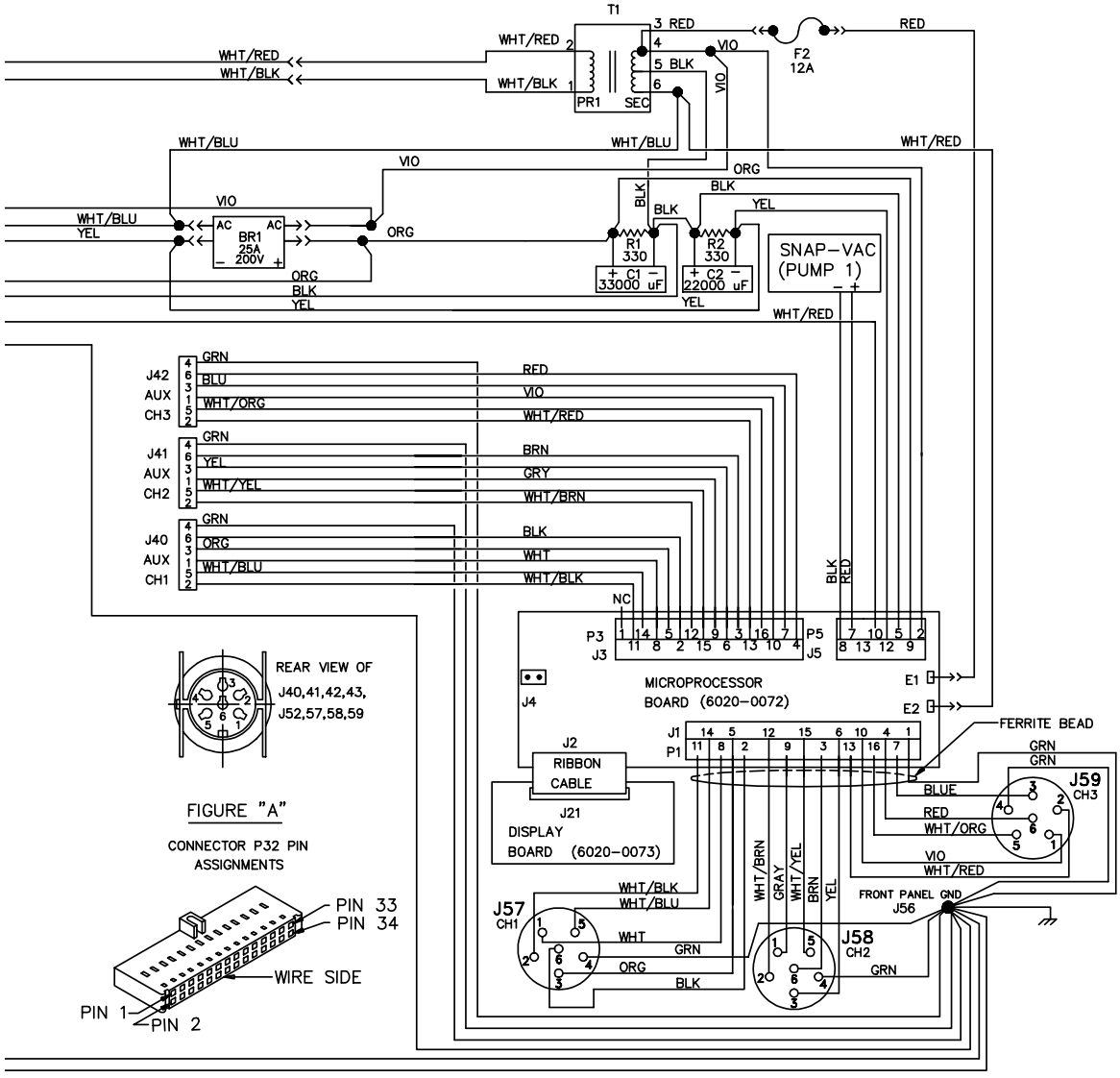
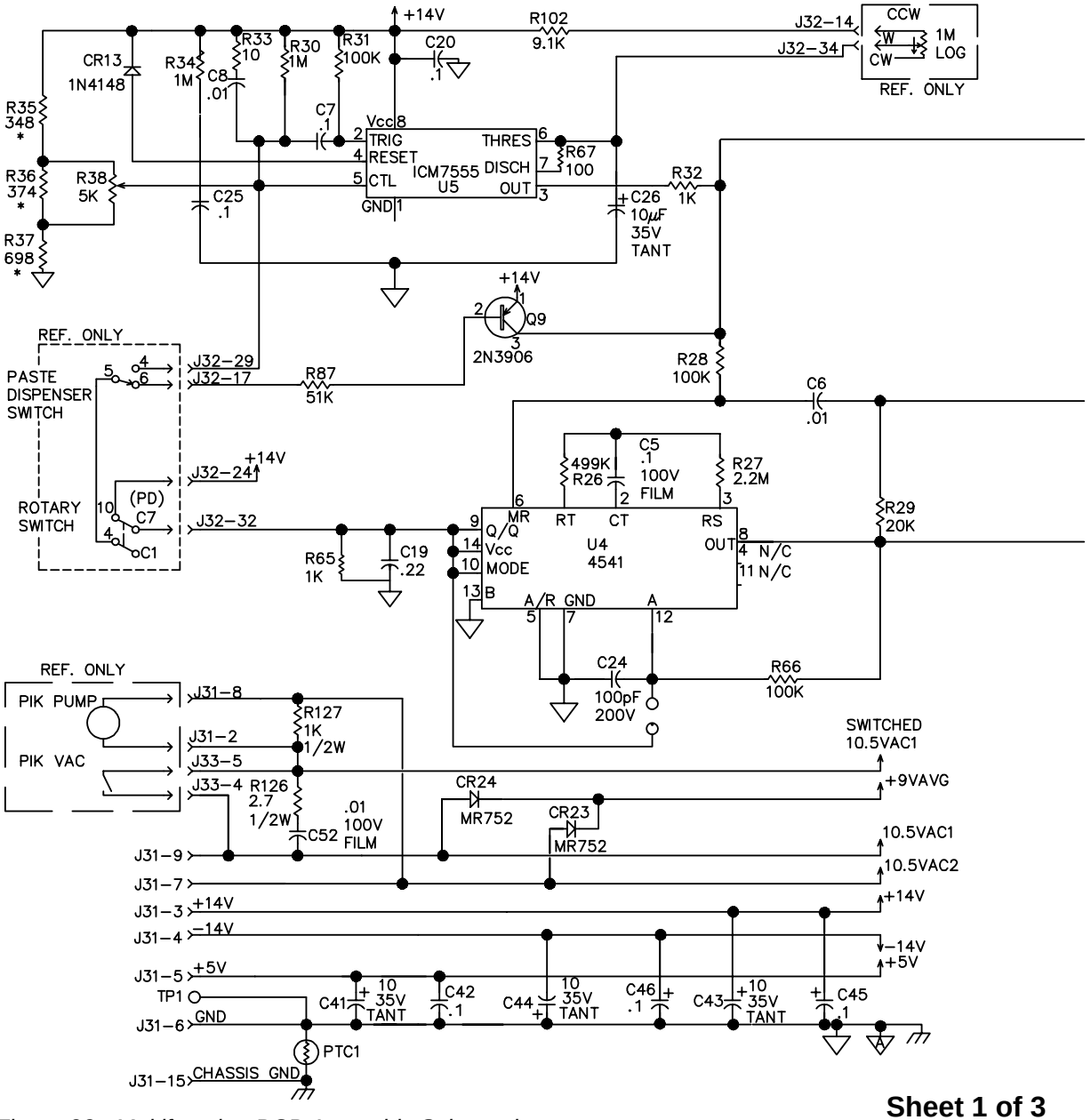


Figure 22. PPS 400, PPS 400J, PPS 400E Wiring Diagram

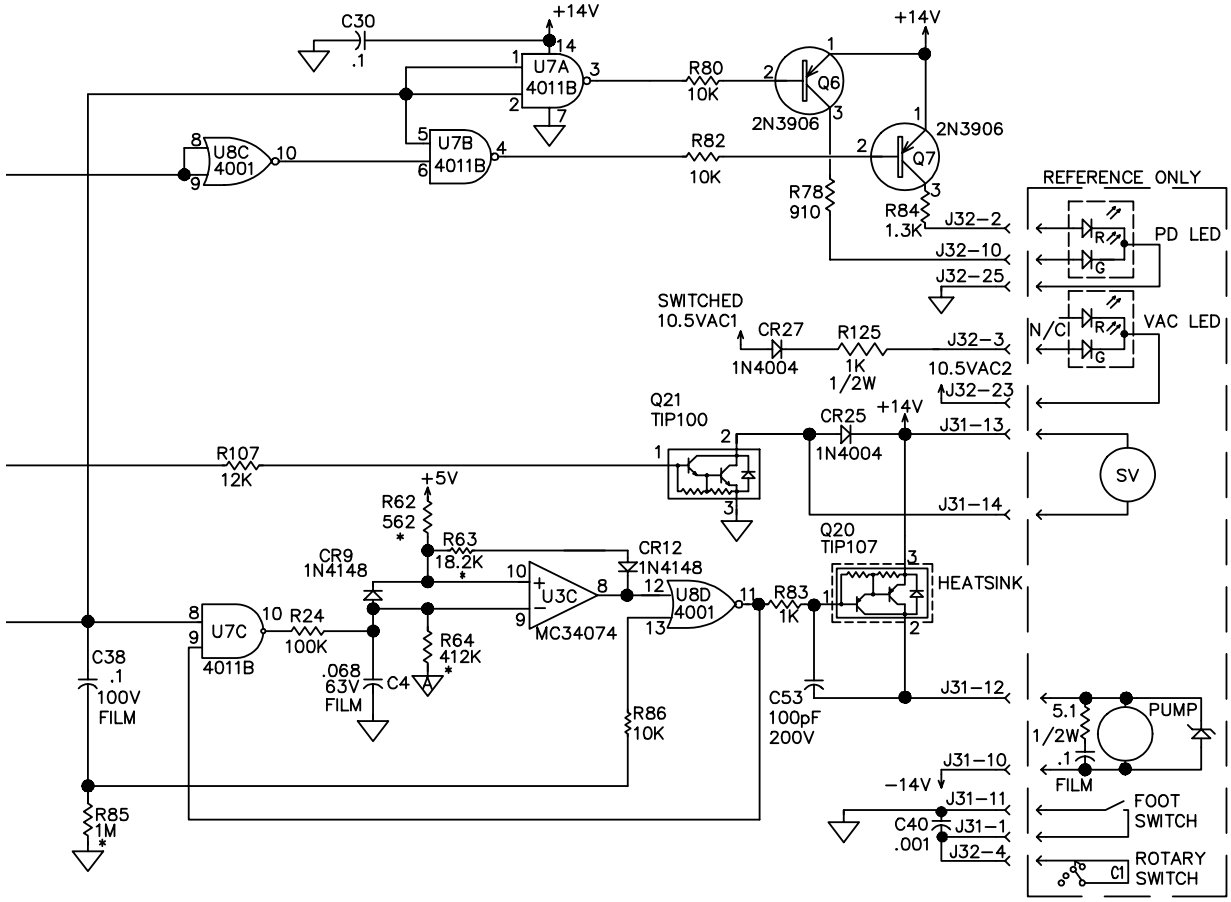

T1
WHT/RED
WHT/BLK
WHT/RED
WHT/BLK
PR1
SEC
3 RED
4
5 BLK
6
VIO
VIO
F2
12A
RED
WHT/BLU
WHT/BLU
WHT/RED
VIO
ORG
BLK
BLK
YEL
VIO
WHT/BLU
YEL
AC
AC
BR1
25A
200V
ORG
R1
330
R2
330
+ C1 −
33000 uF
+ C2 −
22000 uF
SNAP−VAC
(PUMP 1)
ORG
BLK
YEL
YEL
WHT/RED
J42
AUX
CH3
GRN
BLU
WHT/ORG
RED
VIO
WHT/RED
J41
AUX
CH2
GRN
YEL
WHT/YEL
BRN
GRY
WHT/BRN
J40
AUX
CH1
GRN
ORG
WHT/BLU
BLK
WHT
WHT/BLK
NC
BLK
RED
P3
J3
P5
J5
MICROPROCESSOR
BOARD (6020−0072)
J4
E1
E2
REAR VIEW OF
J40,41,42,43,
J52,57,58,59
FIGURE "A"
CONNECTOR P32 PIN
ASSIGNMENTS
PIN 33
PIN 34
WIRE SIDE
PIN 1
PIN 2
J2
RIBBON
CABLE
J21
DISPLAY
BOARD (6020−0073)
J1
P1
FERRITE BEAD
GRN
GRN
J59
CH3
BLUE
RED
WHT/ORG
VIO
WHT/RED
WHT/BRN
GRAY
WHT/YEL
BRN
YEL
FRONT PANEL GND
J56
J57
CH1
WHT/BLK
WHT/BLU
WHT
GRN
ORG
BLK
J58
CH2
GRN

MULTIFUNCTION PCB ASSEMBLY SCHEMATIC



Sheet 1 of 3

Figure 23. Multifunction PCB Assembly Schematic



LAST USED	NOT USED
C53	
CR27	
J34	J1-J30
MOV1	
Q25	
R128	
TP1	
U10	

NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL RESISTOR VALUES ARE IN OHMS
2. UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE 1/4W 5% CARBON FILM
3. * DENOTES 1/8W 1% METAL FILM RESISTOR.
4. UNLESS OTHERWISE SPECIFIED, ALL CAPACITOR VALUES ARE IN MICROFARADS.
5. UNLESS OTHERWISE SPECIFIED, ALL CAPACITORS ARE CERAMIC, 50V MIN.

MULTIFUNCTION PCB ASSEMBLY SCHEMATIC CONT'D

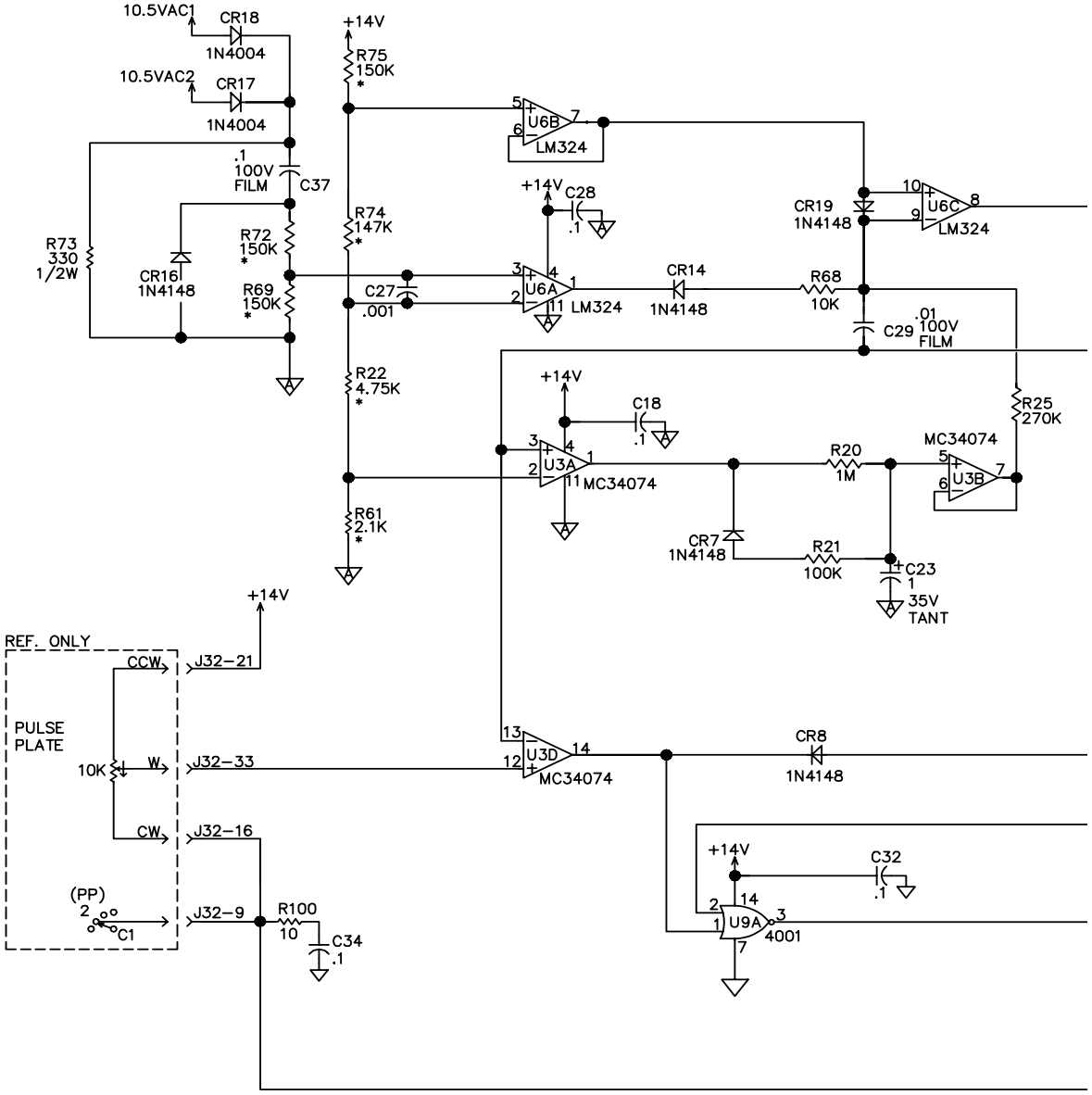
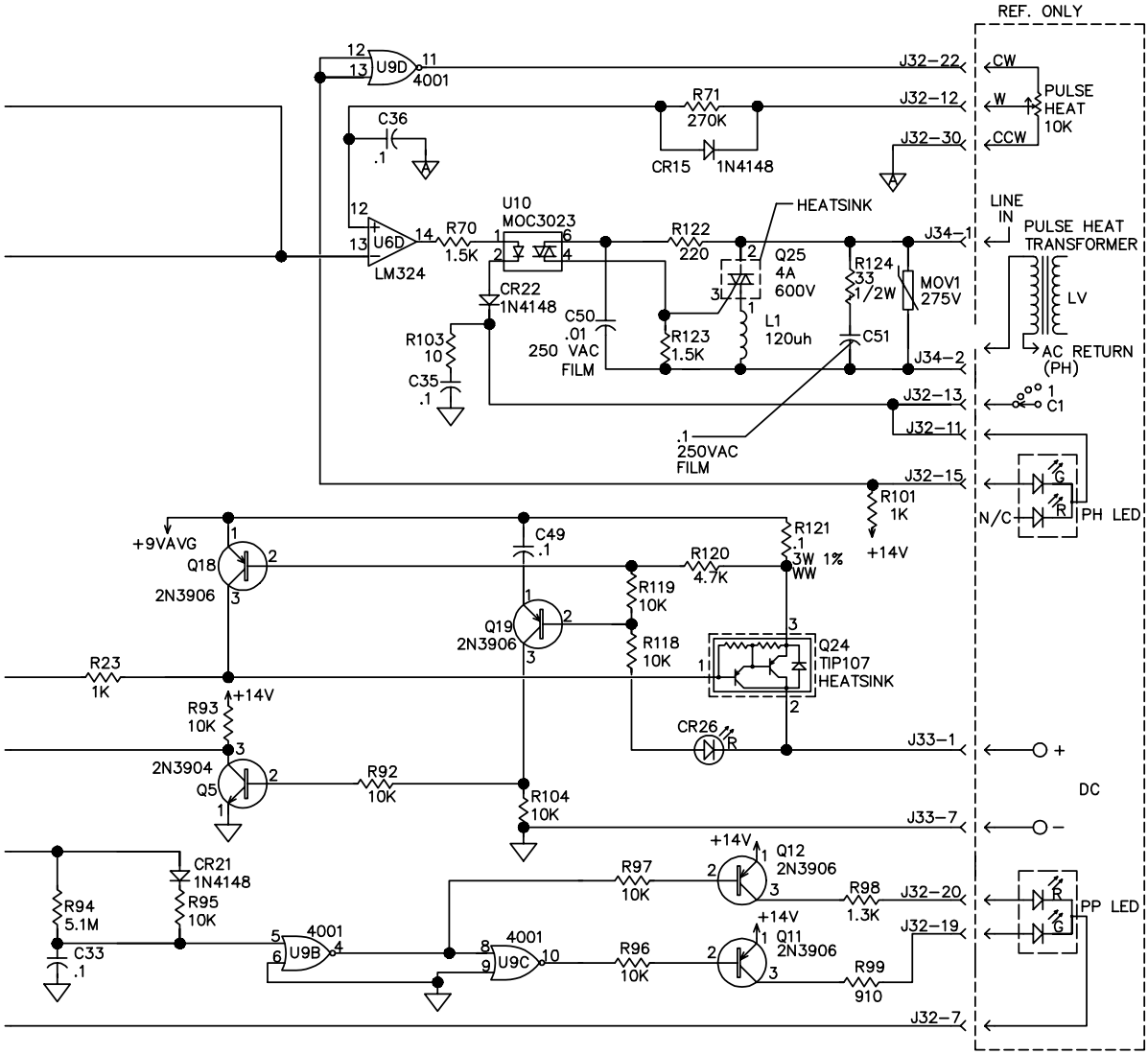


Figure 23. Multifunction PCB Assembly Schematic Cont'd

Sheet 2 of 3


REF. ONLY
U9D
4001
J32-22
CW
J32-12
W
PULSE HEAT 10K
CCW
J32-30
C36
.1
R71
270K
CR15
1N4148
U10
MOC3023
HEATSINK
LINE IN
PULSE HEAT TRANSFORMER
U6D
LM324
R70
1.5K
R122
220
Q25
4A
600V
J34-1
R124
33
1/2W
MOV1
275V
LV
CR22
1N4148
C50
.01
250 VAC
FILM
R123
1.5K
L1
120uh
C51
AC RETURN (PH)
J34-2
R103
10
C35
.1
J32-13
C1
J32-11
.1
250VAC
FILM
J32-15
R101
1K
+14V
N/C
PH LED
+9VAVG
Q18
2N3906
C49
.1
R121
.1
3W 1%
WW
R120
4.7K
R119
10K
Q19
2N3906
R118
10K
Q24
TIP107
HEATSINK
R23
1K
R93
10K
+14V
CR26
J33-1
+
DC
2N3904
Q5
R92
10K
R104
10K
J33-7
-
+14V
Q12
2N3906
CR21
1N4148
R97
10K
R98
1.3K
J32-20
PP LED
R94
5.1M
R95
10K
4001
U9B
4001
U9C
+14V
Q11
2N3906
J32-19
C33
.1
R96
10K
R99
910
J32-7

MULTIFUNCTION PCB ASSEMBLY SCHEMATIC CONT'D

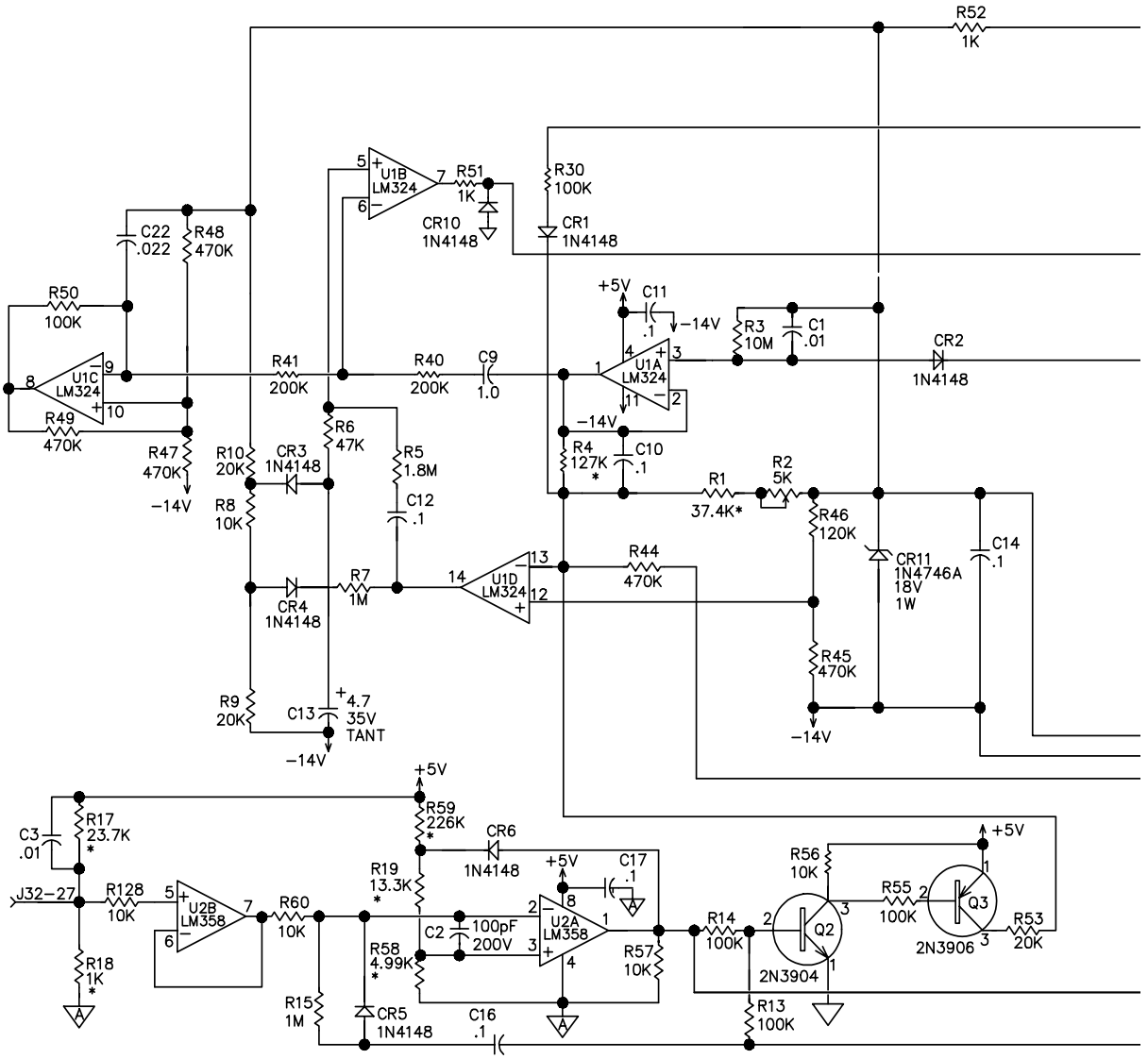
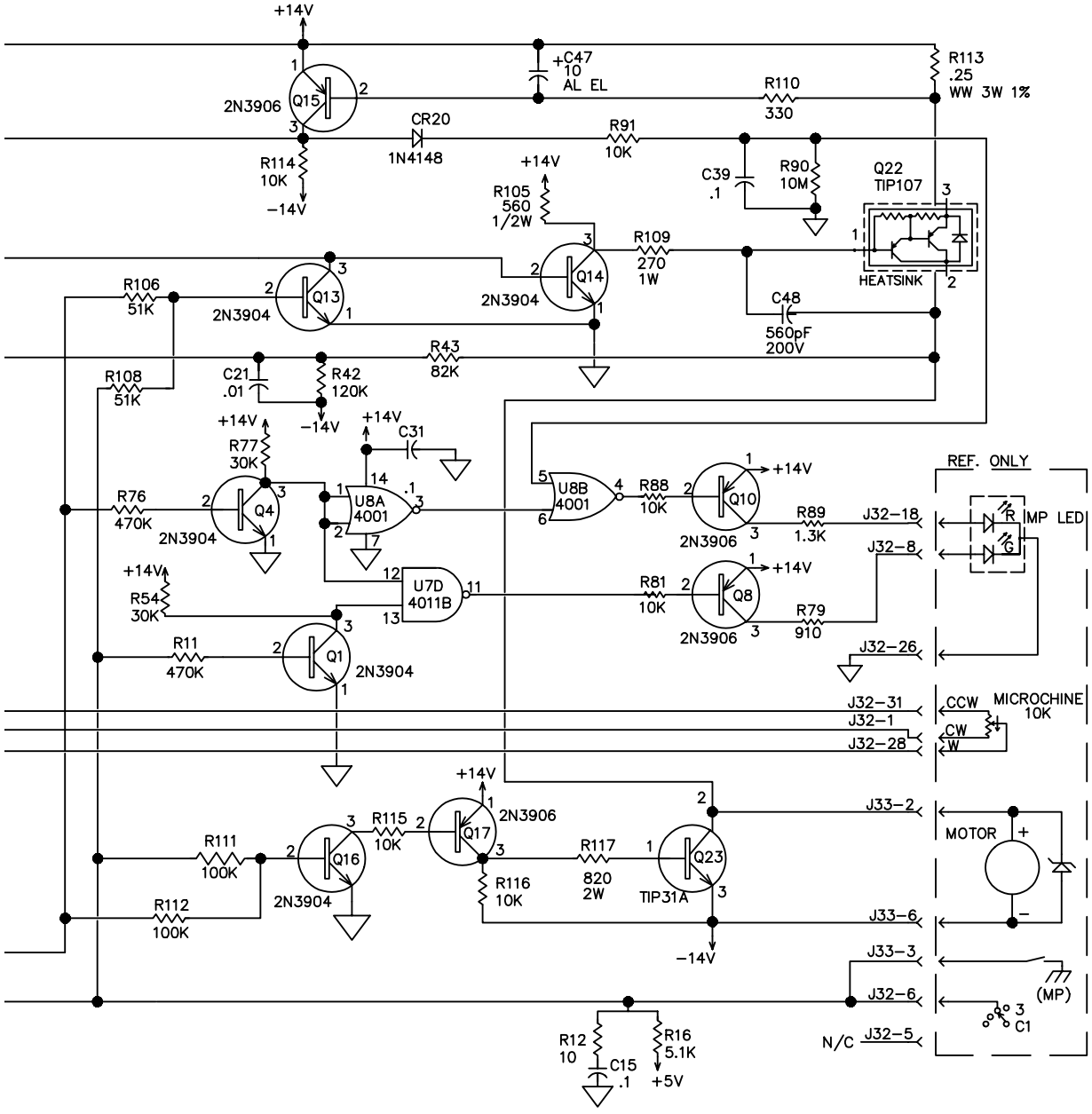
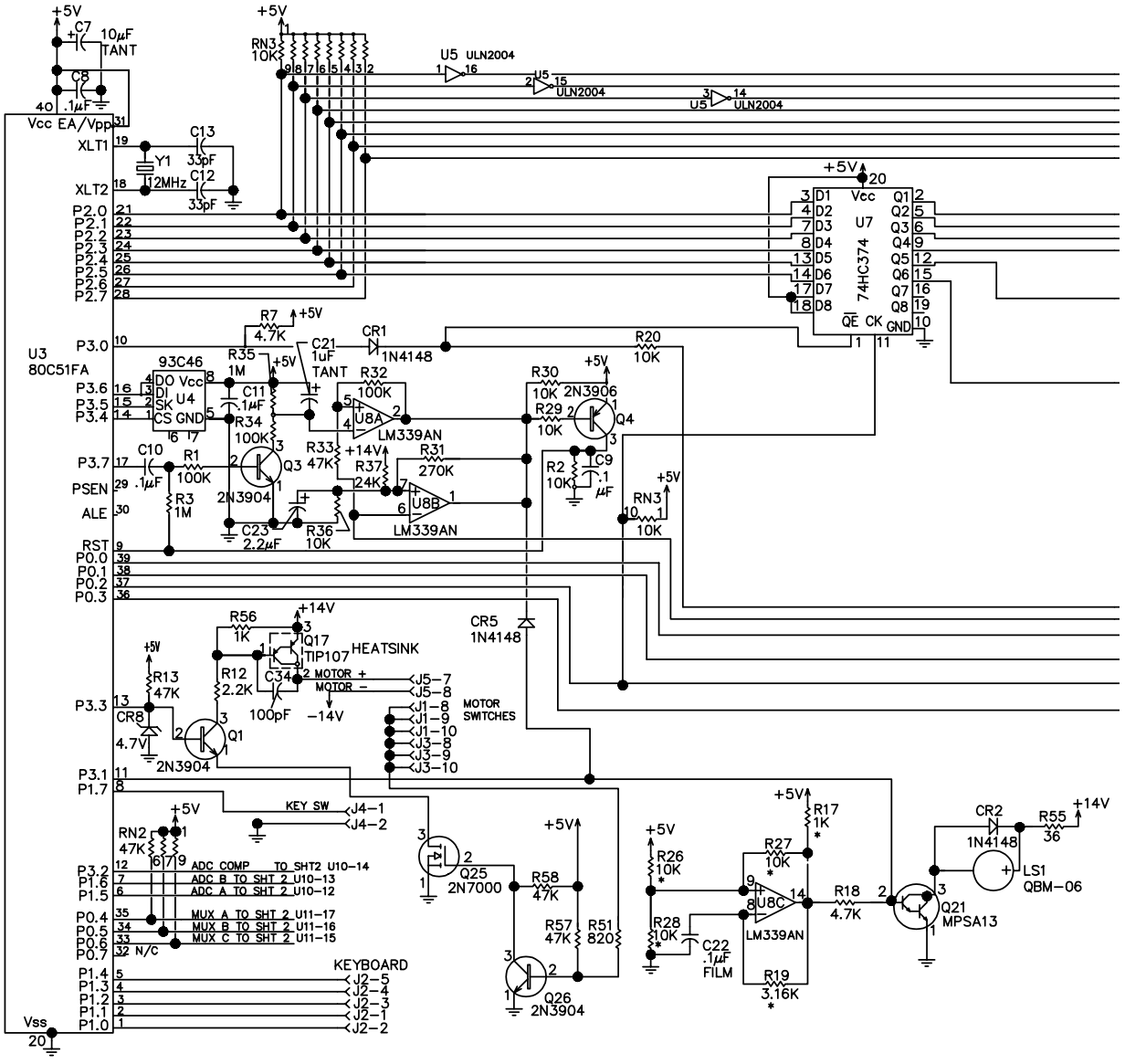


Figure 23. Multifunction PCB Assembly Schematic Cont'd

Sheet 3 of 3

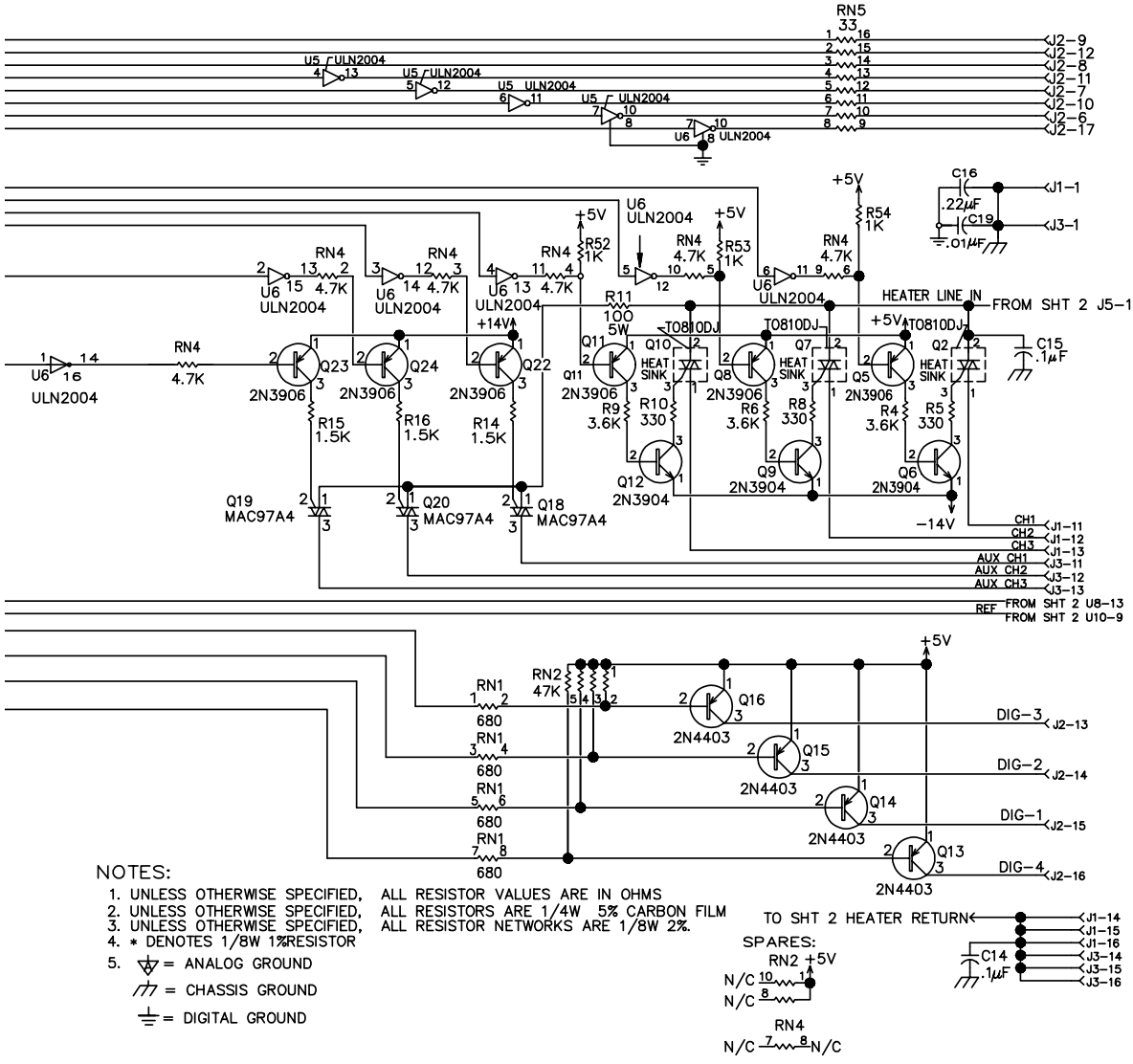

+14V
+C47
10
AL EL
R113
.25
WW 3W 1%
R110
330
2N3906
Q15
CR20
1N4148
R91
10K
R114
10K
−14V
+14V
C39
.1
R90
10M
Q22
TIP107
R105
560
1/2W
R109
270
1W
HEATSINK
R106
51K
Q13
2N3904
Q14
2N3904
C48
560pF
200V
R43
82K
R108
51K
C21
.01
R42
120K
−14V
+14V
C31
R77
30K
+14V
R76
470K
Q4
2N3904
U8A
4001
U8B
4001
R88
10K
Q10
2N3906
+14V
R89
1.3K
J32−18
REF. ONLY
R
G
MP LED
J32−8
R54
30K
+14V
U7D
4011B
R81
10K
Q8
2N3906
+14V
R79
910
J32−26
R11
470K
Q1
2N3904
J32−31
J32−1
J32−28
CCW
CW
W
MICROCHINE
10K
+14V
R115
10K
Q17
2N3906
J33−2
R111
100K
Q16
2N3904
R117
820
2W
Q23
TIP31A
MOTOR
+
−
R116
10K
R112
100K
−14V
J33−6
J33−3
J32−6
(MP)
3
C1
N/C
J32−5
R12
10
C15
.1
R16
5.1K
+5V

MICROPROCESSOR PCB ASSEMBLY SCHEMATIC



Sheet 1 of 2

Figure 24. Microprocessor PCB Assembly Schematic



NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL RESISTOR VALUES ARE IN OHMS
2. UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE 1/4W 5% CARBON FILM
3. UNLESS OTHERWISE SPECIFIED, ALL RESISTOR NETWORKS ARE 1/8W 2%.
4. * DENOTES 1/8W 1%RESISTOR
5. = ANALOG GROUND
   = CHASSIS GROUND
   = DIGITAL GROUND

MICROPROCESSOR PCB ASSEMBLY SCHEMATIC CONT'D

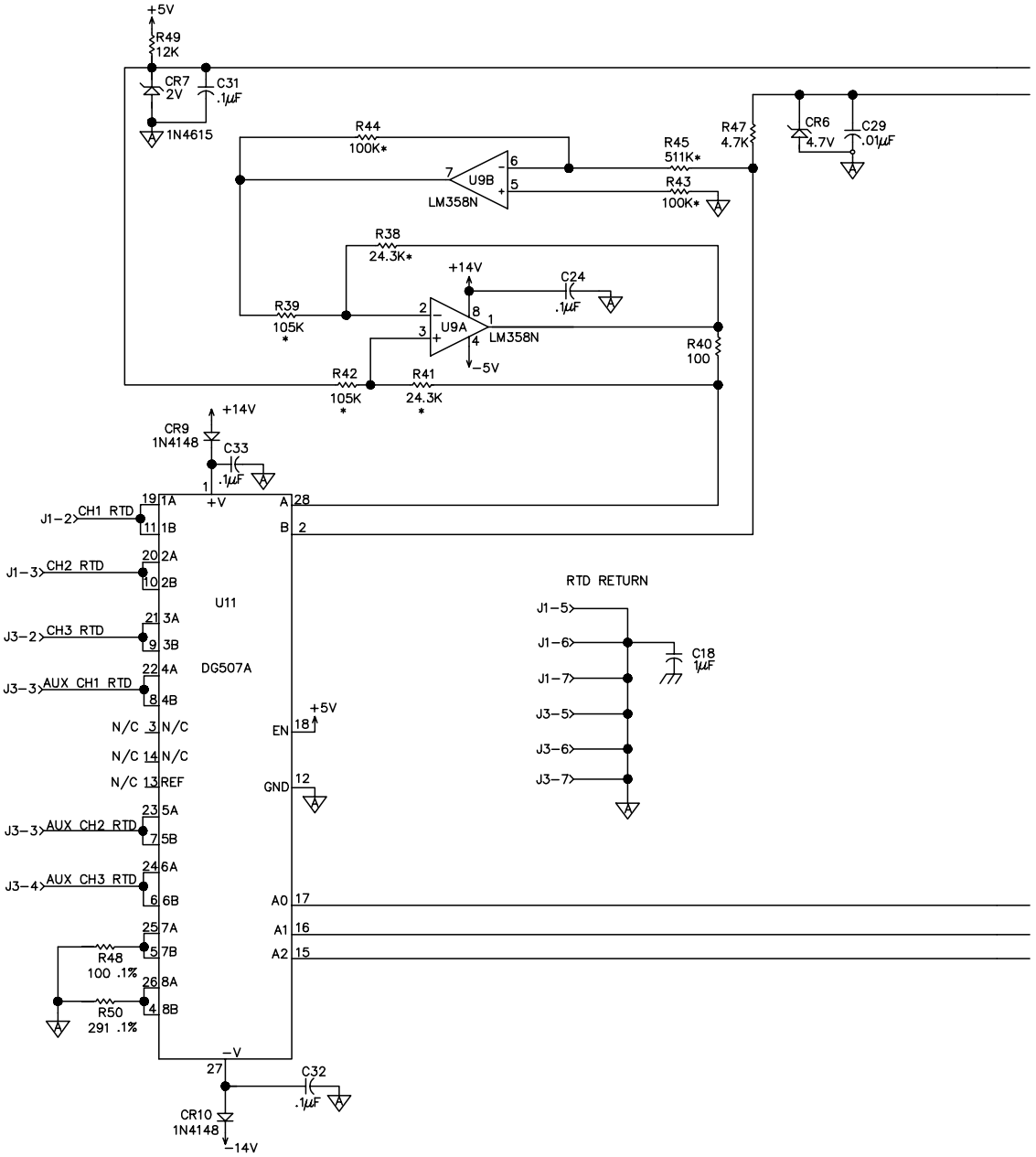
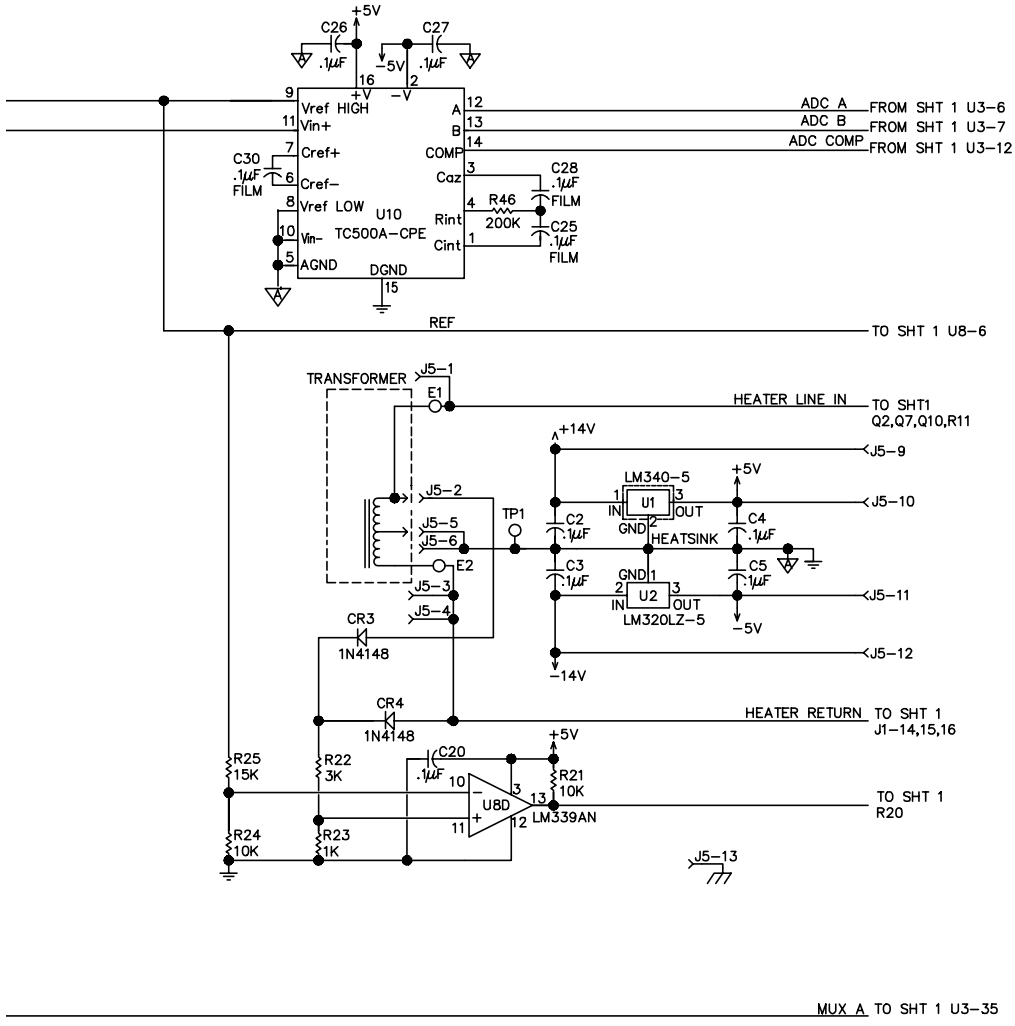


Figure 24. Microprocessor PCB Assembly Schematic Cont'd

Sheet 2 of 2


+5V
C26
.1µF
C27
.1µF
-5V
16
+V
-V
2
9
Vref HIGH
11
Vin+
7
Cref+
C30
.1µF
FILM
6
Cref-
8
Vref LOW
10
Vin-
5
AGND
U10
TC500A-CPE
DGND
15
12
A
13
B
14
COMP
3
Caz
C28
.1µF
FILM
4
R46
200K
Rint
1
Cint
C25
.1µF
FILM
ADC A
FROM SHT 1 U3-6
ADC B
FROM SHT 1 U3-7
ADC COMP
FROM SHT 1 U3-12
REF
TO SHT 1 U8-6
TRANSFORMER
J5-1
E1
HEATER LINE IN
TO SHT1
Q2,Q7,Q10,R11
J5-2
J5-5
J5-6
E2
J5-3
J5-4
TP1
+14V
J5-9
LM340-5
U1
IN
GND
OUT
HEATSINK
+5V
J5-10
C2
.1µF
C4
.1µF
C3
.1µF
C5
.1µF
GND
U2
IN
OUT
LM320LZ-5
J5-11
-5V
J5-12
-14V
CR3
1N4148
CR4
1N4148
HEATER RETURN
TO SHT 1
J1-14,15,16
R25
15K
R22
3K
C20
.1µF
+5V
R21
10K
10
U8D
13
11
12
LM339AN
TO SHT 1
R20
R24
10K
R23
1K
J5-13
MUX A
TO SHT 1 U3-35
MUX B
TO SHT 1 U3-34
MUX C
TO SHT 1 U3-33

DISPLAY PCB ASSEMBLY SCHEMATIC

Figure 25. Display PCB Assembly Schematic

ASSEMBLY DRAWING

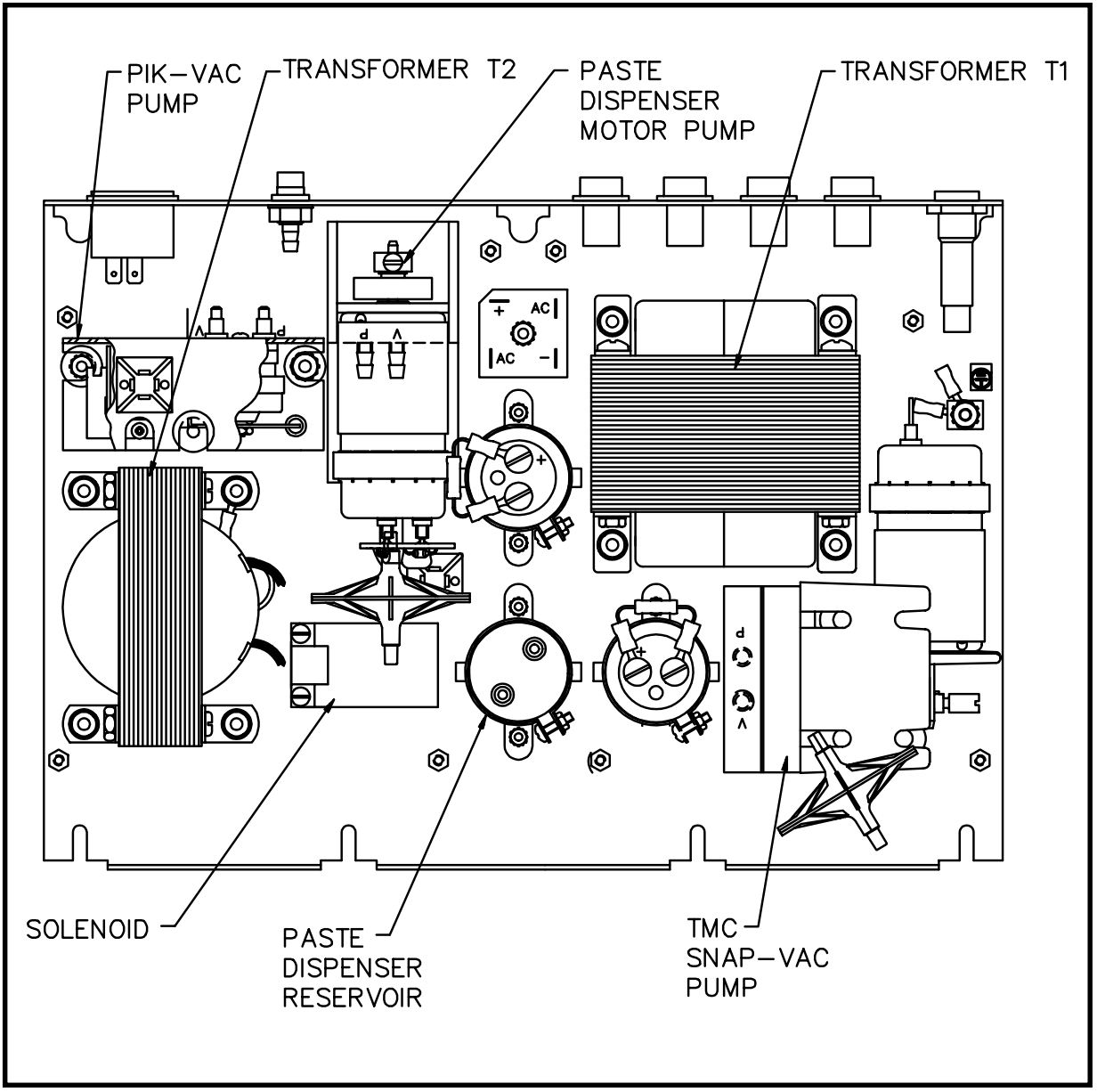


Figure 26. Assembly Drawing

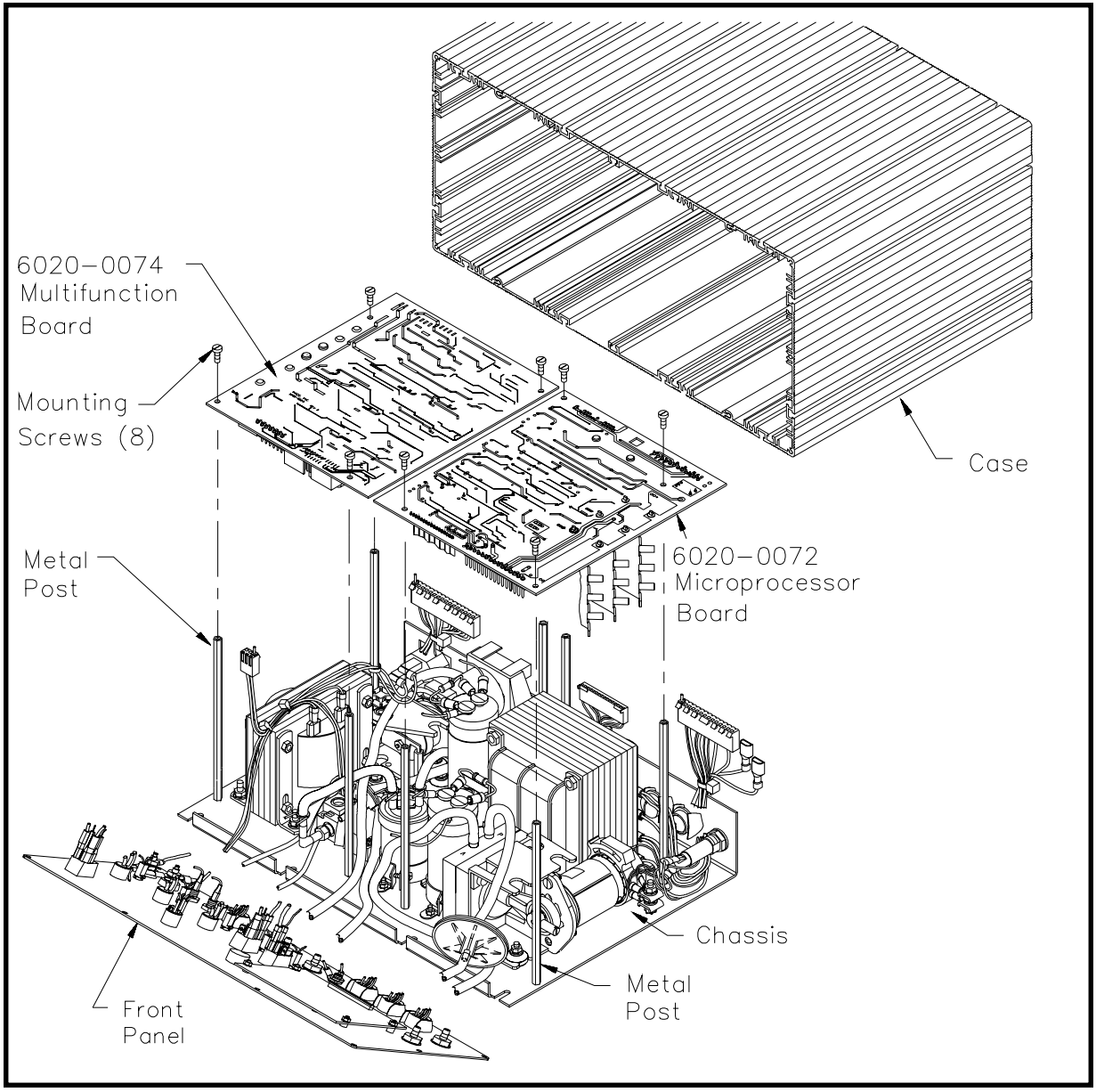


Figure 27. Assembly Drawing Cont'd

AIR HOSE ROUTING

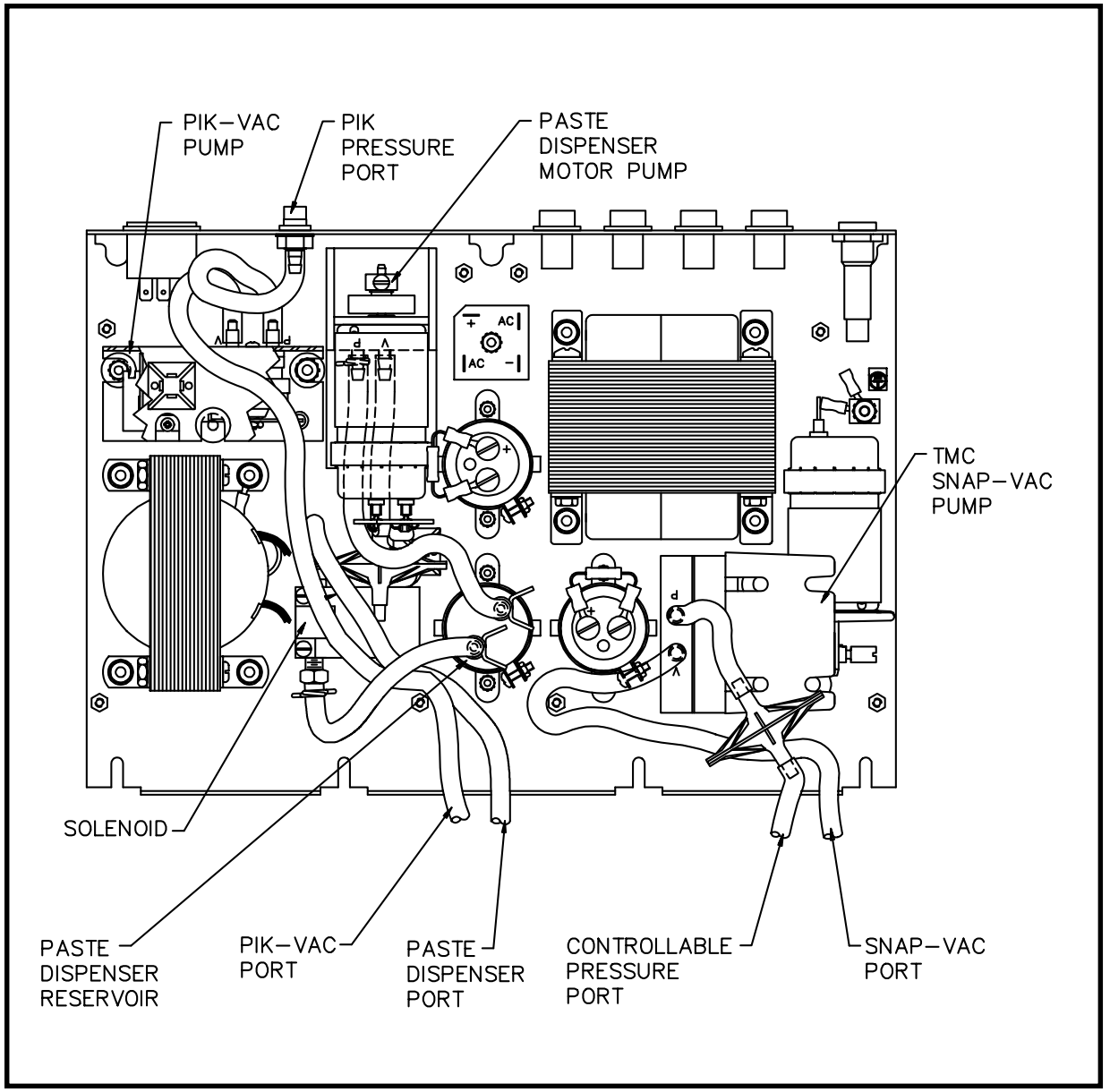


Figure 28. Air Hose Routing

POWER SOURCE

Listed below are the power source parts which may be ordered directly from PACE sales or your local authorized PACE distributor. Refer to Table IV plus Figures 29-31. For handpiece and accessory replacement parts, refer to Tables V, VI and VII or the associated Operation and Maintenance Manual. To obtain parts other than those shown, contact PACE Customer Service directly at Telephone (301) 490-9860, Fax (301) 604-9215.

ITE NO.	DESCRIPTION	PART NUMBER	
		PPS 400 PPS 400J	PPS 400E
1	Main Power Switch	1157-0052	1157-0052
2	Fuse (F1), 5.0 Amp, Time Lag	1159-0253	
	2.5 Amp, Time Lag		1159-0220
3	Fuse (F2), 12.0 Amp, Fast Acting	1159-0257	1159-0257
4	AC Power Receptacle, Fused	1207-0151	1207-0274
5	Fuseholder	1161-0012	1161-0012
6	Motor Pump Assembly, SNAP-VAC	1336-0028	1336-0028
7	Motor Pump Assembly, Paste Disp.	1336-0027	1336-0027
8	Pump Assembly, Pik-Vac	1334-0021	1334-0021
9	Microprocessor PCB Assembly	6020-0072	6020-0072
10	Multifunction PCB Assembly	6020-0074	6020-0074
11	Display PCB Assembly	6020-0073	6020-0073
12	Pressure Reservoir	1140-0034	1140-0034
13	Solenoid, 12 Volt	1194-0016	1194-0016
14	VisiFilter, External (installed between Snap-Vac Port & handpiece air hose)	1309-0028	1309-0028
15	VisiFilter Replacement Elements	1309-0027-P50	1309-0027-P50
16	VisiFilter, Internal (located inside power source)	1309-0020	1309-0020

Table IV. Power Source Replacement Parts

POWER SOURCE CONT'D

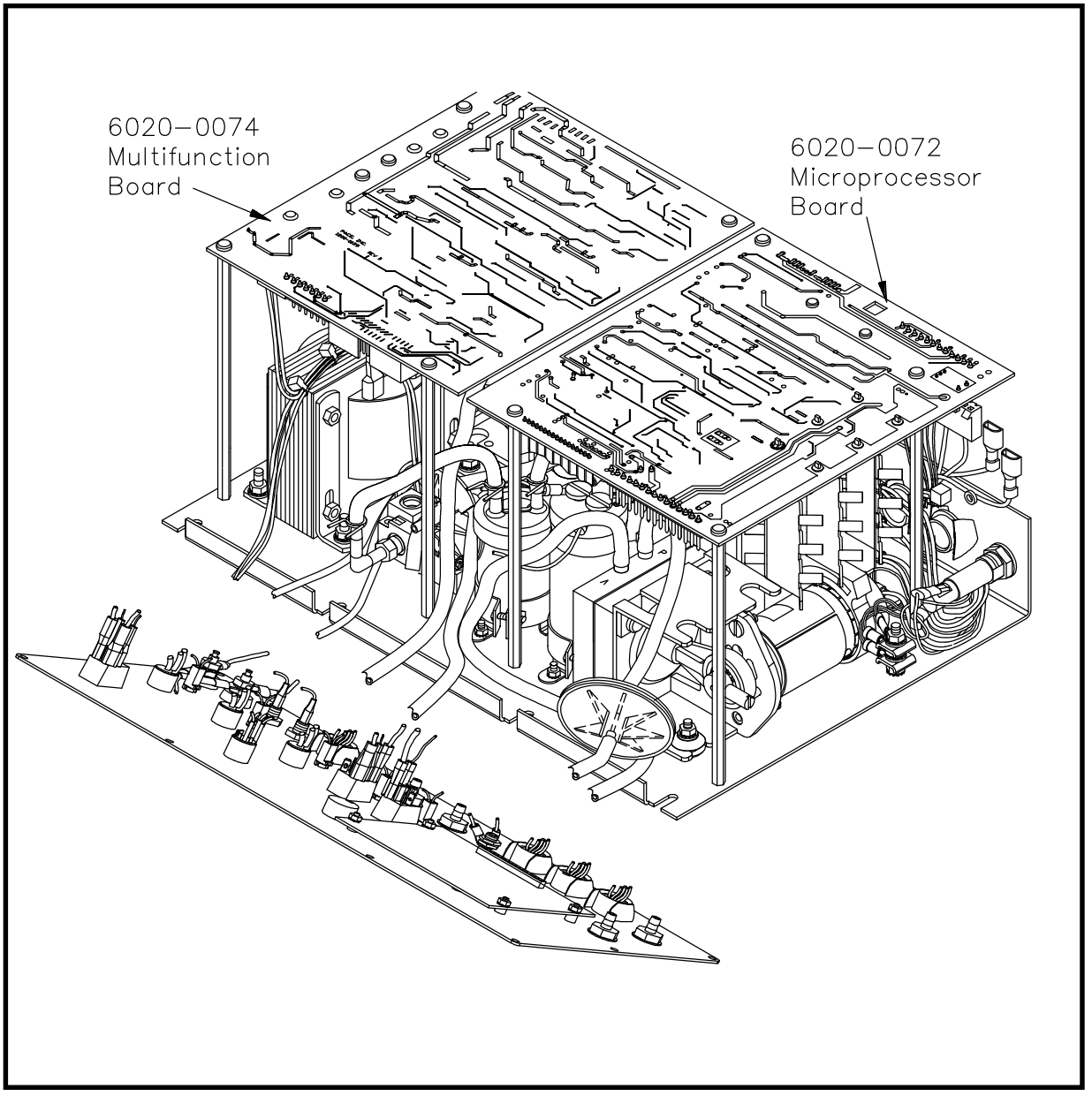


Figure 29. Power Source Replacement Parts

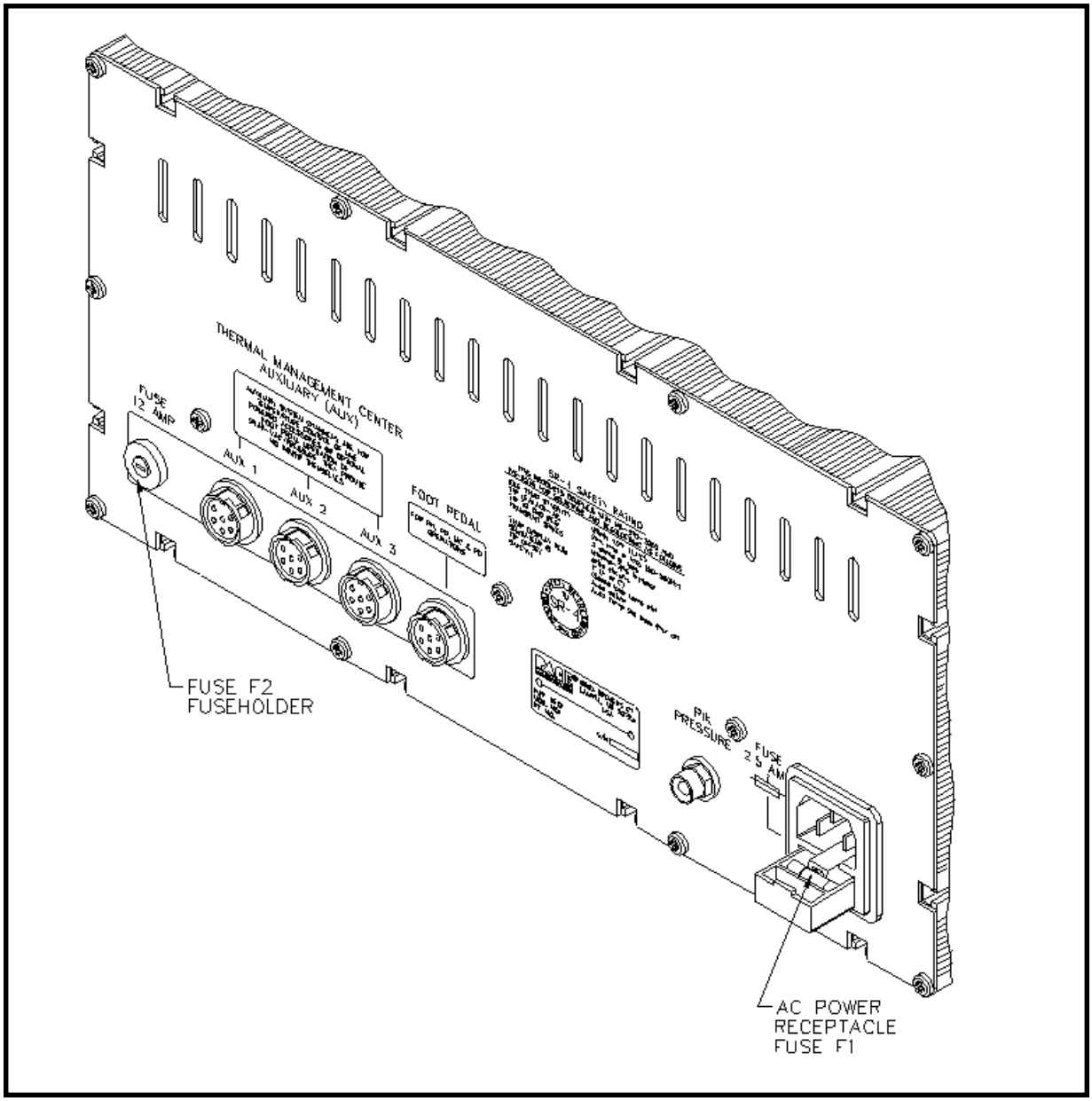


Figure 30. Power Source Replacement Parts Cont'd

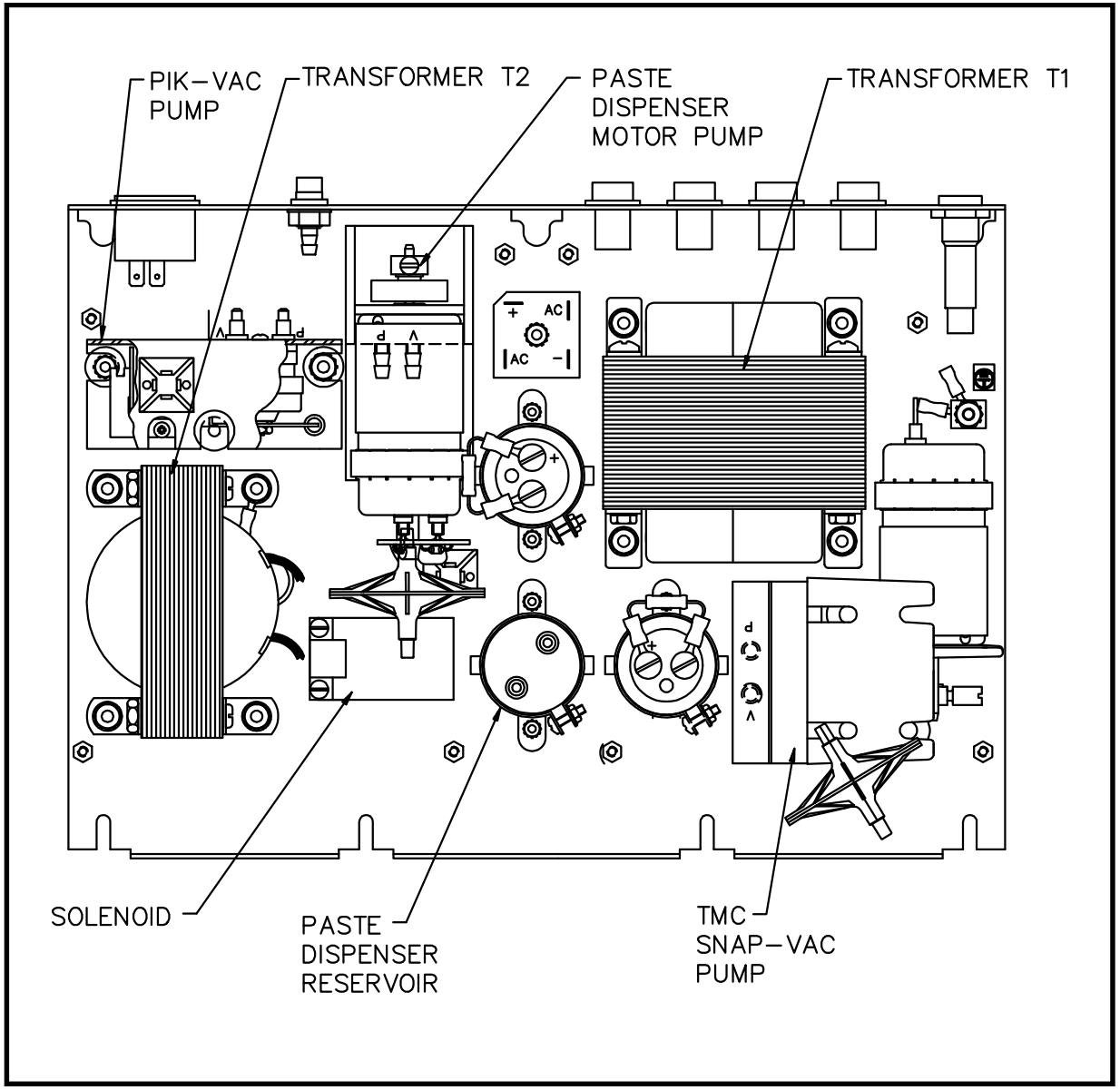


Figure 31. Power Source Replacement Parts Cont'd

POWER SOURCE ACCESSORIES

ITEM NO.	DESCRIPTION	PART NUMBER
1	Power Cord	
	PRC 2000/J (100 VAC & 115 VAC Systems)	1332-0094
	PRC 2000E (230 VAC Export Systems)	1332-0093
2	Foot Pedal	6008-0115
3	Paste Dispenser Kit	6993-0152
4	Tip Redi-Rak	6021-0007
5	Handpiece Redi-Rak	6019-0023
6	Tip & Temperature Chart Holder Assembly	1257-0186-P1
7	Cleaning Station (Complete)	6021-0006
8	Fiber Cleaning Tool	1100-0232
9	Fiber Filler, Replacement	1127-0013
10	Sponge Cleaning Tool	1100-0233
11	Sponge Filler, Replacement	4021-0006
12	SX Tip & Tool Stand (for air handpieces)	6019-0044
13	SP Tip & Tool Stand (for SP handpieces)	6019-0043
14	ThermoTweez Tip & Tool Stand	6019-0046
15	Paste Dispenser Cubby	6019-0038
16	SMR Cubby	6019-0022

Table V. Power Source Accessories

REPLACEMENT PARTS

HANDPIECES

ITEM NO.	DESCRIPTION	PART NUMBER
1	SX-70 Sodr-X-Tractor Handpiece	6010-0077-P1
2	Heater & Seal Assembly	6010-0080-P1
3	Glass Chamber	1265-0009-P1
4	Filter	1309-0018
5	Heater Set Screw	1348-0547
6	AdapTip	1360-0083-P1
7	SX-65A Sodr-X-Tractor Handpiece	6010-0073-P1
8	Heater & Seal Assembly	6010-0074-P1
9	Glass Chamber	1265-0009-P1
10	Filter	1309-0018
11	Heater Set Screw	1348-0547
12	SP-2A Sodr-Pen Soldering Iron Handpiece (54 Watts)	6025-0014-P1
13	Heater Assembly	6010-0086-P1
14	Heater Set Screw	1348-0547
15	SP-1A Sodr-Pen Soldering Iron Handpiece (37 Watts)	6025-0013-P1
16	Heater Assembly	6010-0085-P1
17	Heater Set Screw	1348-0547
18	TJ-70 Mini ThermoJet Handpiece	7023-0002-P1
19	Heater Assembly	6010-0084-P1
20	Heater Set Screw	1348-0547

Table VI. Replacement Handpieces

ITEM NO.	DESCRIPTION	PART NUMBER
21	TP-65 ThermoPik Handpiece	7024-0001-P1
22	Heater Assembly	6010-0081-P1
23	Heater Set Screw	1348-0547
24	Vacuum Cups	- - - - - - -
25	4.4mm (0.175") O.D.	1121-0382-P5
26	7.6mm (0.300") O.D.	1121-0383-P5
27	12.7mm (0.500") O.D.	1121-0384-P5
28	TT-65 ThermoTweez Handpiece	7025-0001-P1
29	Heater Assembly With Sensor	6010-0082-P1
30	Heater Assembly Without Sensor	6010-0083-P1
31	Heater Set Screw	1348-0547
32	Cushion Grip Kit	6993-0155
33	Replacement Pads For Cushion Grips	1317-0029-P2
34	Tip Alignment Tool	1100-0234
35	PV-65 Pik-Vac Handpiece	7027-0001-P1
36	Metal Tip, 45° Angle	1121-0413-P5
37	Vacuum Cups & Tips; See TP-65 Handpiece	- - - - - - - - - -
38	MC-65 MicroChine Handpiece	7026-0001-P1
39	Probe Brake Patch Cord	1332-0159
40	Deluxe Tool Kit	6005-0013
	PULSE HEAT HANDPIECES	
41	CT-15 ConducTweez Handpiece	7020-0001-P1
42	TW-15 ResisTweez Handpiece	7009-0005-P1
43	TS-15 StripTweez Handpiece	7012-0002-P1
44	LF-15 LapFlo Handpiece	7013-0004-02-P1
45	Universal Power Cord	7000-0023
46	Tip Screw, 2-56 x 5/32" Lg. (used on items 41 & 42)	1405-0182

Table VI. Replacement Handpieces Cont'd

REPLACEMENT PARTS

HANDPIECE ACCESSORIES

ITEM NO.	DESCRIPTION	PART NUMBER
1	VisiFilter (replaceable element)	1309-0028
2	VisiFilter Replacement Elements	1309-0027-P50
3	Tubing, Clear PVC, 66" Lg.	1342-0001-14
4	Tubing, Clear PVC, 1 inch long	1325-0003-07
5	Tubing, Silicone, Translucent, 54" Lg.	1342-0001-13
6	Hose Clamps	1321-0085-01-P6
7	Cable Marker Kit	6993-0136
8	Quick Change Hose Mount, Female	1259-0086
9	Quick Change Hose Mount, Male	1259-0087
10	Bristle Brush	1127-0002
11	Wire Brush, 3/16" Diameter	1127-0014
12	Wire Brush, 1/8" Diameter	1127-0006
13	Tip Cleaner Kit	6993-0151
14	Tip Tool	1100-0206
15	PACE Screwdriver	1100-0230

Table VII. Replacement Handpiece Accessories

MANUAL IMPROVEMENT & COMMENT FORM

Instructions

1. Duplicate this form and submit comments on the copy. Keep the original to make future comments.
2. Complete all requested information.
3. Submit completed form to:

PACE Incorporated
Applications Engineering
9893 Brewers Court
Laurel MD 20723-1990 U.S.A.
Fax: (301) 604 - 8782

Document Nbr: **5050-0344**	Revision Level: **C**	Date of Submission:

Nature of Change (Identify page and paragraph and include proposed rewrite, if possible.)

Reason for Recommendation

Submitter:

Name:	Company or Organization:
Mailing Address:	Telephone (Include Area Code) Voice: Fax:

Thank you for your comments; they are greatly appreciated!